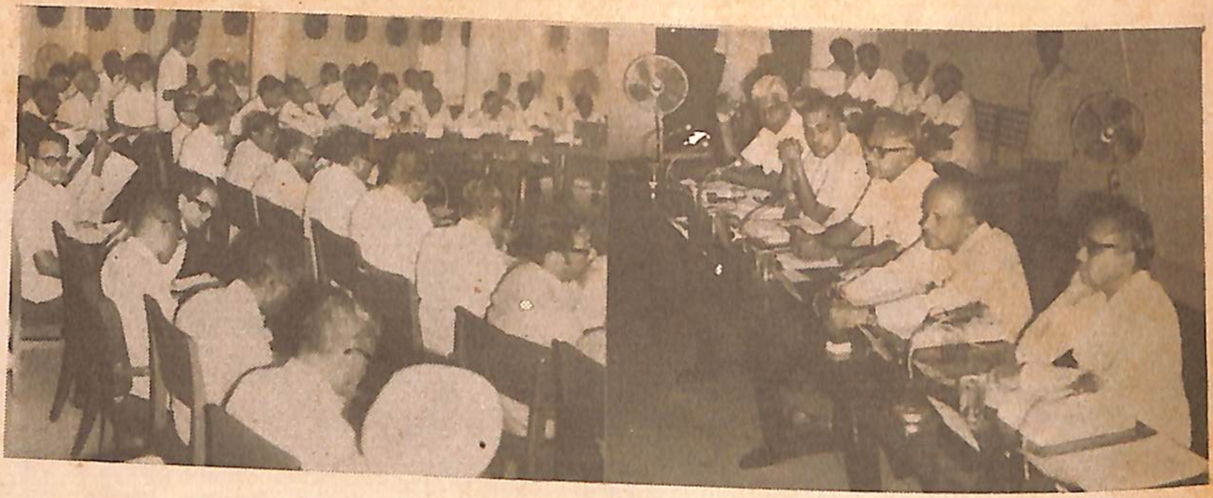
ORISSA REVIEW



Regional Conference of Orissa and Andhra Pradesh on Agricultural and Rural Development Programmes held on 9-8-1979 in the Secretariat Conference Hall, Bhubaneswar

Informal Consultative Committee meeting for Industries, Mining and Geology, Rural Development and Tourism Departments being held at State Co-operative BanK building, Bhubaneswar on 29-8-1979 under the Chairmanship of Shri H. C. Buxipatra, Minister. Shri Saharai Oram, Minister of State for R. D. Department was also present

October 11, 1902 * October 8, 1979

ORISSA GOVERNMENT MOURNS THE DEATH OF LOK NAYAK JAYA PRAKASH NARAYAN

"The apostle of non-violence, social justice, a new and integrated Indian polity is no more with us. Lok Nayak Jaya Prakash who gave a new shape and dimension to the Indian aspiration for social justice and equality, the creation of a social order based on freedom from fear and economic well-being of the common man has left us for ever. The State Government join the people of this vast Nation in recording their profound sense of shock and sorrow at his demise. The Nation has suffered a loss which is irreparable. The void created by his departure will remain for a long time to come. As the Father of a new revolutionary social order, a dreamer and a visionary who was also a great man of action and organization, Jaya Prakash Narayan has few equals in history. His true place is in the hearts of the millions of his countrymen who loved him dearly. We join millions in this country in praying to Lord Almighty that his soul may rest in peace and that his example inspires us with confidence for the new tasks ahead."

The Council of Ministers at an emergent meeting held on 8-10-1979 at 10-00 A. M. condoled the sudden passing away of Shri Jaya Prakash Narayan. It passed the above resolution, which was published in the extraordinary issue of the *Orissa Gazette*, dated 8-10-1979.

ORISSA REVIEW

SEPTEMBER-OCTOBER 1979
Aswin-Kartik
Vol. XXXVI, Nos. 2 & 3

Editor-in-Chief
K. C. MISHRA
Director of Information & Public Relations

Editor
B. B. PATNAIK

Assistant Editor
PRAHARAJ S. N. NANDA

Associate Editor
S. K. PATNAIK

Cover Design
ASIT MUKHERJEE

* * *

Publisher
Information & Public Relations Department
Government of Orissa
Bhubaneswar

Printer
Orissa Government Press
Madhupatna, Cuttack

Subscription : Annual—Rs. 6·00, per copy : Re. 0·50

* * *

ORISSA REVIEW seeks to provide a condensed record of the activities and official announcements of the Government of Orissa and other useful information. Many items appear in summarised form. Such items should not be treated as complete and athoritative versions.

Although published on behalf of the Government of Orissa, Information & Public Relations Department, the views in the Items expressed in the 'Orissa Review' are not necessarily those of the Government of Orissa.

IN THIS ISSUE

Sarva Dharma Prayer ... 1
Durga Stotra ... 3
Contribution of the under-privileged to the Indian Poetic tradition : A view from Oriya Poetry. 5
Sakta Tantrik Temples at Bhubaneswar 9
The Task before the Scientists and Engineers of India. 15
Random Rambling .. 19
Career and Achievement of a British Servant in Orissa. 21
Energy Options—Solar Energy .. 23
Chamunda, a manifestation of Devi .. 29
The Forgotten City of Jaugado .. 33
Democracy in Education through the Ages. 37
'Uttarayan' and Baikunthanath Pattanayak. 41
Achievements in Animal Husbandry Sector in Orissa. 45
Sun Temple at Konark .. 47
A Small Men's Bank .. 51
Mahisamardini Durga .. 53
Drought and it's Prevention .. 59
(A review and analysis of the problem with remedial measures suitable for Orissa).

SARVA DHARMA PRAYER

Om tatsat Sri Narayana Tu
Purushottama Guru Tu
Siddha Buddha Tu Skanda Vinayaka
Savitha Pavaka Tu
Brahma Majda Tu Yahav Shakti Tu
Ishu Pita Prabhu Tu
Rudra Vishnu Tu Rama Krishna Tu
Rahim Tao Tu
Vaasudeva Go Vishwrupa Tu
Chidananda Hari Tu
Advitiya Tu Akaala Nirbhaya
Atmalinga Shiva Tu

Blessed are they who keep God as their goal and strive accordingly. Zeros have no value, but they gain in value when linked to the number one. God is the number one and all the worldly things are zeros. Independent of God they are mere ciphers, but when associated with Him, they gain in importance.

—Shri Ramakrishna Paramahansa

The most highly priced article in the world is time, if even a moment is wasted, life is a waste.

—Sathya Sai Baba

The daily prayers are like fresh river-waters which are flowing by the yardside of your house. Whoever takes bath therein will keep himself pure and clean.

—Prophet Mohammed

Come unto Me, all ye that labour and are heavily laden, and I will give you rest.

—Jesus Christ

"Go ye, oh Bhikshus, and wander forth for peace of the many, for the welfare of the many, for the benefit of the people, for their gain, their good and their happiness, teach Dharma, oh Bhikshus to mankind."

—Buddha

DURGA STOTRA

SHRI AUROBINDO

Hymn To Durga

I

Mother Durga ! Rider on the lion, giver of all strength, Mother. beloved of Siva ! We, born from thy parts of power, we the youth of India, are seated here in thy temple. *Listen, O Mother, descend upon earth, make thyself manifest in this land of India.*

II

Mother Durga ! From age to age in life after life, we come down into the human body, do thy work and return to the Home of Delight. Now too we are born, dedicated to thy work. *Listen, O Mother, descend upon earth, come to our help.*

III

Mother Durga ! Rider on the lion, trident in hand, thy body of beauty armour-clad, Mother, giver of victory, India awaits thee, eager to see the gracious form of thine. *Listen, O Mother, descend upon earth, make thyself manifest in this land of India.*

IV

Mother Durga ! Giver of force and love and knowledge, terrible art thou in thy own self of might, Mother beautiful and fierce. In the battle of life, in India's battle, we are warriors commissioned by thee; Mother, give to our heart and mind a titan's strength, a titan's energy, to our soul and intelligence a god's character and knowledge.

V

Mother Durga ! India, world's noblest race, lay whelmed in darkness. Mother, thou risest on the eastern horizon, the dawn comes with the glow of thy divine limbs scattering the darkness. Spread thy light, Mother, destroy the darkness.

VI

Mother Durga ! We are thy children, through thy grace, by thy influence may we become fit for the great work, for the great Ideal. Mother, destroy our smallness our selfishness, our fear.

VII

Mother Durga ! Thou art Kali, naked garlanded with human heads, sword in hand, thou slayest the Asura. Goddess, do thou slay with thy pitiless cry the enemies who dwell within us, may none remain alive there, not one. May we become pure and spotless, this is our prayer, O Mother, make thyself manifest.

VIII

Mother Durga ! India lies low in selfishness and fearfulness and littleness. Make us great, make our efforts great, our hearts vast, Make us true to our resolve. May we no longer desire the small, void of energy, given to laziness, stricken with fear.

IX

Mother Durga ! Extend wide the power of Yoga. We are thy Aryan children, develop in us again the lost teaching, character, strength of intelligence, faith and devotion, force of austerity, power of chastity and true knowledge, bestow all that upon the world. To help mankind, appear, O Mother of the world, dispel all ills.

X

Mother Durga ! Slay the enemy within, then root out all obstacles outside. May the noble heroic mighty Indian race, supreme in love and unity, truth and strength, arts and letters, force and knowledge ever dwell in its holy woodlands, its fertile fields, under its sky-scraping hills, along the banks of its pure-streaming rivers. This is our prayer at the feet of the Mother. Make thyself manifest.

XI

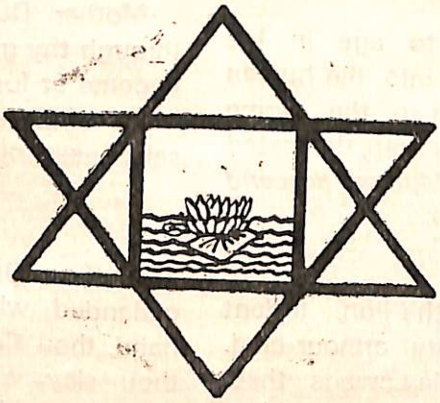
Mother Durga ! Enter our bodies in thy Yogic strength. We shall become thy instruments, thy sword slaying all evil, thy lamp dispelling all ignorance. Fulfil this yearning of thy young children, O Mother. Be the master and drive thy instrument, wield thy sword and slay the evil, hold up the lamp and spread the light of knowledge. Make thyself manifest.

XII

Mother Durga ! When we possess thee, we shall no longer cast thee away; we shall bind thee to us with the tie of love and devotion. Come, Mother, manifest thyself in our mind and life and body.

XIII

Come, Revealer of the hero-path. We shall no longer cast thee away. May our entire life become a ceaseless worship of the Mother, all our acts a continuous service to the Mother, full of love, full of energy. This is our prayer, *O Mother, descend upon earth, make thyself manifest in this land of India.*



CONTRIBUTION OF THE UNDER-PRIVILEGED TO THE INDIAN POETIC TRADITION

(A view from Oriya Poetry)

SHRI SITAKANTA MAHAPATRA

It is possible to look at the topic from two distinctly different points of view : one outlining the manner in which the theme of the under-privileged has been treated in the Indian poetic tradition ; and two, the ways in which Indian poetic tradition has been enriched by the creative writings of those who belong to the under-privileged classes. The second aspect would seem to be based upon an assumption of the sociological basis of creative writing, an assumption that tends to look upon creativity itself as largely determined by the social class from whom the writer springs. It is assumed that the intellectual and moral sympathies, the value-judgments and the approach to life and reality varies according to the writer's social class. This point of view which is Marxist in its inspiration thus emphasizes the social determination of arts. It is no doubt a debatable point of view. A writer is no doubt located in a given sociological milieu : to an extent also he does inherit the values and prejudices of the class to which he belongs but he is *creative* only to the extent he is able to look beyond such limited horizon. He is one whose sympathies are with mankind as a whole and not with a given class or segment of society. There are however a number of literary critics who still contribute to this theory of social determination of arts and it is possible to look at the subject from this point of view.

It is easier to approach the subject from the other point of view outlined earlier. Writers have generally looked upon the whole of mankind as their concern. Occasions have, however, arisen when values have been in conflict, social groups have been in conflict. There has been oppression on one group by another. The 'haves', the more affluent, the more powerful and ruthless have tried to harass and exploit the 'have-nots', the under-dogs, the poor and the week. In such situation a creative writer has been required to declare his sympathies. It has become a moral or an ethical question to do so. In a situation where the underdog is being crushed or exploited by his more powerful neighbour, it can only be a moral depravity for the writer to keep quiet. Such conspiracy of silence can only spell the death of creativity.

It is not merely a question of taking side in a given sociological situation. The under-privileged has always excited the sympathies of the writer. The phrase "under-privileged' is itself a 19th century formulation but the proposition still remains valid, as in earlier centuries the under-privileged was only called by other names, such as being poor or down-trodden.

Oriya literature from its very beginning has been pre-occupied with a concern for the small man. Stories and legends built around Lord Jaganath described this concern in numerable ways. The chariot of Lord would not move until Dasia Bauri belonging to the lowlest or the low caste or the leper poet Dinakrishna had come and taken a view of the Lord and his dark eyes. He was no doubt the Lord of the universe but He was more for those who were in the lowest rungs of the ladder and this was not merely in the modern socio-economic sense. It was also true in the theological and religious sense of earlier centuries. The sinner, the depraved, those who had lost their track, were particularly remembered by Him. It was like a father's concern for the wayward son. The son who was in the right track was less of a concern. After all he will be able to look after himself. The errant son who had strayed away from the path of righteousness excited His compassion in larger measure. Many of the soul-throbbing poems composed in hohour of Lord Jagannath over the centuries were from among the out-caste by the composers and poets who stood in the lowest rungs of the social ladder. Salabega, the Muslim poet, Dinakrishna, the leper poet, Saria Vika, the begger poet they had significant contributions to the corpus of poetry dedicated to Lord Jagannath.

The moral and social background to the Oriya epics the Ramayana and the Mahabharata can be viewed in the context of this concern for the under-privileged. In Ramayana King Ramachandra banishes his beloved wife Sita to the forest because of a statement made by a washerman regarding his own wife. In Mahabharata Krishna is very much on the side of the under-privileged, the Pandavas. The Kauravas were puffed up by power and glory and this led to their nemesis. The entire concern of the Mahabharata in favour of the under-privileged is symbolised in a signle incident. This is when, having come for Krishna's blessings Duryodhan preferred to sit by the side of the sleeping Krishna's head rather than at his feet. Scarcely did he realise that when Krishna woke up from his sleep he would first look at the Pandava sitting at his feet. In Ramayana itself Rama remains on the side of the under-privileged. The armies of monkeys were really no match for the sophisticated armoury and militia of Ravana. The entire concern in these epics is for the under-privileged who is finally destined to emerge victorious. During the medieval period in the love-lyrics inspired by the Radha-Krishna theme there was really no emphasis on social classes but there were numerous unknown poets and composers belonging to the lower class of society who composed heart-throbbing lyrics on the Krishna theme.

A special mention must be made on the contribution of the blind tribal poet Bhima Bhoi to the Oriya poetic tradition. Bhima Bhoi represents the highest point in the creative writer's concern for man, for the lowliest and the lost among men in the Oriya poetic tradition. It is difficult to find more telling lines than the following :

> "Let my life be condemned to hell
> for ever
>
> But let the world be redeemed."

Bhima Bhoi stated this concern for man and his destiny in a unsurpassed simplicity of language. He could embody most of the burning problems of degradation, depravity and deprivation in soul-stirring poetry. No wonder he has been a constant source of inspiration to the younger generation of poets. He was himself a writer belonging to the under-privileged class : a tribal of the Kondh community and belonging to an extremely poor family. Yet there was no self-pity in his writing. On the other hand there was a high degree of passion for man and his suffering suffusing his poetry.

The forties saw the emergence of a pre-occupation with the under-privileged as a socio-economic and ideological phenomenon. This was primarily due to the emergence of Marxist ideology and was reflected in creative activity as much as the thinking of the intellectuals. The Gandhian line of thinking, in its concern for the common man and the under-privileged, came as its close ally even though in methodological and metaphysical formulations they were poles apart. Gandhi's concern was humanistic and not ideological inspired by Tolstoy's 'Unto the last'. The last man down the line was of utmost concern to him. The Harijans, the backward classes, the socially and morally deprived the minorities—They were his special concern. They were, for example Harijans, the sons of God and not untouchables. Gopabandhu Dash's poetry combines this Gandhian humanitarian concern for the under-privileged with a high patriotic flavour. In Godavarish Mishra's lyrics the common man found a new meaning and relevance. It was concrete and realistic in its language. In early Sochi Routroy and Anant Patnaik, in Bhagwati Panigrahi and many others of this generation, the concern for the under-privileged took a different direction. It was now more militant, more aggresive in posture and postulated a class war in which the privileged and the under-privileged, the 'haves' and 'havenots', the bourgeoisie and the proletariat were ranged against each other. The privileged classes were the war-mongers, the blood-suckers, the enemies of the people. The poet was now determined to be on the side of the havenots. He now looked upon life and reality with the eyes of the under-dog. Later Routroy himself and Anant Patnaik no doubt changed over to more individualistic and metaphysical themes and strayed away from the social pre-occupation of their earlier poetry. To Routroy for example, the Sun Temple at Konark was no longer an exalted piece of architecture or sculpture of a monument to man's spirit fashioning reality out of mute stone. He saw in it instead, only a "heap of broken hearts" of labourers who had worked themselves to death at the behest of a cruel monarch. The builders had not seen the smiling crops. They had not seen the moonshine in the blue sky. They had not seen the smile in the eyes and lips of their loved ones whom they had left behind in their homes. They had only known endless toil under the orders of a tyrant ruler who only wanted to immortalise himself. It was a deliberately formulated point of view because it was professedly looking at Konark with the eyes of a havenot. Routroy had declared elsewhere in the manner of Mayakovosky, that when the reader touched his poems, he touched the heart of man. He declared : 'I am not Tagore or Shelly, I am Sachi Routroy the poet of this earth". The voice on the side of the under-privileged had thus become strident and ideological. It was no longer theological or metaphysical as in ancient or medieval times or broadly humanistic as in the Gandhian era poets such as Gopabandhu Dash. It was rhetorical and sometimes vociferous in its assertions. Rabi Singh's poetry was more intense in its passion for the under-privileged and also lyrical in the treatment of theme. He was basically in revolt not merely against the bourgeoisie but against social obscurantism, exploitation, corruption in our social life and religious dogmatism. Perhaps the most refined voice of dissent and protest in the name of the common man and on the side of the under-privileged was the voice of Godavarish Mohapatra. His poetry breathes fire but it was more a scathing satire that spared nobody. His was an allout war against privilege-social, ecnoomc, moral and religious. He spoke in the name of equality for all men and freedom for fear.

Numerous other poets since independence have treated the theme of the under-privileged in a more mellowed and subtle manner. They have neither declared any war on the side of the under-dogs nor taken to rhetorics; but their poems reveal clearly where their sympathies lie. It is true theire has been a greater concern with the fate of the individual and his creative identitity in a mass age. The dehumanisation of arts and literature has been a continuing theme in their poetry but they are not devoid of social concern. They speak softly but sometimes it is like cold fire breathing down the neck of social obscurantism and indivious class-distinctions.

These poets have brought in newer avenues of concerns for human destiny both in metaphysical and social terms that is more reminiscent of Bhima Bhoi and Saria Vika. It is not overtly religious in its concern for the under-privileged or for man and his destiny nor is it ideologically celebrative and strident. But it is in the wider stream of the Oriya poetic tradition. This tradition has always had a special place for the 'last man', for those who were either deprived or depraved, those who were lonely or lost either in economic or moral terms. This tradition always spoke fearlessly and compassionately for such men and believed that man's concern for man is the true basis not only of religiosity or community but also for man's individual moral existence and his creative identity. Sometimes the tradition has manifested itself with ideological trapping and at other times with overt theological and moral overtones. But the concern has remained a constant feature permeating the tradition right from the soul-throbbing prayers of Saria Vika both for personal salvation and community welfare down to the modern poets who speak in metaphysical tones of their concern with man and his destiny today. The under-privileged themselves have also enriched this great tradition in no small measure.

Secretary, Home
Orissa Secretariat
Bhubaneswar.

●

CHIEF SECRETARY ADVISES ALL GOVERNMENT DEPARTMENTS AND PUBLIC UNDERTAKINGS FOR MOBILISATION OF PAY ROLL SAVINGS GROUPS

Shri S. M. H. Burney, Chief Secretary to State Government in a recent letter addressed to all Secretaries, Revenue Divisional Commissioners, Heads of Departments, Chief Executive of all Public Undertakings and all Collectors has requested to mobilise Pay Roll Savings Groups in the concerned offices of the State Government and Undertakings in a big scale. Shri Burney has requested all to co-operate in this endeavour so that hundred per cent enrolment could be achieved as quickly as possible.

It may be recalled that during the last few years Orissa has made rapid strides in this direction and the number of pay roll groups functioning in the State is 879 with a total membership of 1,50,000. The monthly deposit on this score as revealed by the 31st March 1979 comes to Rs. 255·48 lakhs.

As the Pay Roll Savings Scheme is easily operated, only on the strength of a letter of authorisation by the employees to their Drawing and Disbursing authorities to effect necessary deductions, the depositors are relieved of going to the Post Office each time to deposit their savings in their postal accounts. Besides bringing in usual benefit by way of interest for the depositers, the scheme also ensures a cash remuneration of 2·5 per cent for the Cashier or Disbursing Officer on the deposits.

Sakta Tantrik Temples at Bhubaneswar

DR. H. C. DAS

Sakta tantrism that has a long and continuous history played a conspicuous role in shaping the Indian mind over the ages. This religion has changed its variegated colour from time to time in accordance with the changing social demands—from the guiding principles of primitive hunting rituals and agricultural magic to that of movement of national awaking, from the esoteric cults and practices arising out of the formal to a liberal universal religion which had left a deep impress upon the latter. It has universal appeal on account of its flexible nature throwing its doors open to all people irrespective of caste and creed. When we turnover the pages of religious history we find that female principle stood for the oppressed people symbolising the liberating potentialities in the class divided, patriarchal and authoritarian social set up of India, and this alone explains why constant attempts were made from different corners to blacken Sakta tantrik ideas and philosophy. But due to the wide celebrity and universal appeal the Sakta tantrism crept into mainstream of Indian religions turning them partially or completely female-oriented and highlighting the all powerful mother goddess in numerous manifestations.

Of all the regions of India, Orissa (Ancient Kalinga) has the distinction of possessing numerous Sakta tantric pithas, a vast mass of Tantrik literature mostly in palmleaf manuscripts, numerous Sakta tantrik temples and innumerable images of the pantheon. Hevajra Tantra, a Buddhist Tantric Text of 7th century A. D., refers to Uddiana (Present Orissa) as first of the four famous tantric pithas of India. In the tantric texts like Jnanarnava Tantra Namasottarasato, Brihanila Tantra (referring to the Sakta pithas of India) we come across Puri, Viraja, Ekamra, Cuttack and Bhadrak as important centres. Since this paper deals with Sakta tantric temples of Bhubaneswar I refrain from discussion of other Sakta centres of Orissa.

Bhubaneswar popularly known as Ekamra kshetra or Swanardri in the Sanskrit texts like Ekamra Purana, Swanadri Mohadaya, Ekamra Chandrika, Kapila Samhita and Tirthachintamani, has a continuous cultural history at least from the fifth century B. C. This kshetra on account of numerous temples dedicated to Siva, Sakti and Visnu is also known as city of temples. It is perhaps the only place in the whole of India which preserves temples in successive and chronological order from 6th century to the 16th century A. D. in an compact area providing plentiful materials to the archaeologists, historians, art historians for study.

There are various legends with regard to origin of Ekamra khetra. One such legend recorded in Siva purana highlights Sakta importance of the place. The story runs as follows. Once Parvati requested Siva to tell her the name of the important sacred pithas like Kasi. Siva in smiling face described Ekamra Khetra in Utkal Desh, the holiest of the holy places. Having heard of the place she wanted to see it and finally with his permission mounted upon her vehicle, Lion and hastened to Ekamra bana. She was pleased to see such a nice place inhabited by the gods and sages adorned with groves and lakes. She was surprised to see one thousand cows pouring their milk upon a Siva lingam. Parvati stayed there to worship Siva lingam daily in the disguise of a cowherd girl. Kritti and Vasa, two demon brothers were infatuated of the beauty of Parvati and addressed her in a sweet voice with a request to marry her. Parvati was at a loss to decide the course to be adopted. Instantly she recalled Mahadeva who appeared in the disguise of a cowherd with a flute in his hand and whispered her that they were ordained to be killed by her. He further instructed her the way to be followed for their destruction. In accordance with his advice Parvati addressed the demon in a charming voice, that she would be their spouse if they would fulfil her vow. Her vow was that she would go round the sacred khetra of Ekamra standing on their shoulders. Enchated by Her sweet words they readily agreed to act as she desired. Parvati thus went round the Kshetra standing on their shoulder and Kritti and Vasa while carrying her put forward steps in utter mirth. Parvati was seeking an opportunity and ultimately pressed them down and they fell unconscious on the ground. The spot where the two demons were killed is now popularly known as Devi Padahara.

This puranic story is also attested by sculptural evidence. In the western wall of a dilapidated temple located in front of Bhubaneswari temple in the precinct of Lingaraja, we find the image of Parvati standing on the shoulders of Kritti and Vasa. The story pre-eminently highlights the Sakta influence in the Saivite Kshetra of Bhubaneswar, in the early phase of fluorescence and in support of that Parvati who in the disguise of Gopaluni had killed Kritti and Vasa came to be regarded as the Pitha Devi of Bhubaneswar kshetra.

Gopaluni temple (9th century A. D.)

This temple of khakhara order is situated to the north of Lingaraj temple within the great courtyard. This is stylistically a temple of *panchayaatan* in pattern with square ground plan. Since the structure is deeply plastered it is difficult to find out, the sculptural peculiarity. The image of Gopaluni otherwise known as Bhubaneswari is the presding deity. She is holding a full blown lotus in her right hand while the left hand in Varada mudra and is buried in the pedestal from the waist. Architecturally the temple is not earlier than 9th century, showing architectural peculiarity of a khakhara variety evidently meant for the Sakta Shrine at Bhubaneswar.

Here it may be mentioned that the Sakta influence at Bhubaneswar was felt since seventh century A. D. The Sapta Matrika and Durga images in the temple of Parasurameswar steer clear the influence of Saktism at Bhubaneswar in the early phase of evolution.

Vaital Temple (C. 8th century A. D.)

The temple of Vaital is situated on the Rath danda to the west of Bindu Sarovara. It is a remarkable monument in view of its peculiar form and profuse workmanship on the outer surface. The Vimana is four sided and in a long ridge is covered with three Kalasa and is devoid of any projection or buttress. The shape of the temple looks like Gopuram of the South Indian Architecture but is rare in Orissan Architecture. Its Jagamohan is of traditional Orissan type with clear storey on the top. The Jagamohan is free from ornamentation but the Vimana is profusely decorated. Here the connotation of the word Vaital is necessary. Manamohan

Ganguly opines that the word Vaital is derived from the Sanskrit word 'Vaitra' or a sea-borne vessel. This is justified on the ground that outward appearance of the crowning feature of the temple is similar to the hull of a reversed ship. The three elements in the crown look like the masts of a ship. In another version Mr. Ganguly says that the crowning elements the temple represent the vigitarian food, Vaita (Pupkin goourd). Dr. K. C. Panigrahi holds the opinion that the connotation of Vaital is derived from the term vetal or spirit through which the Kapalikas and Tantrikas attained their salvation. In the Swarnadri Mahodaya, the goddess Chamunda, presiding deity of the temple, is depicted as Kapalini and Siva as Kapali. The Kapalikas indulged in esoteric practices based on spiritual intimacy with the beautiful ladies made the temple a centre of their activities. Chamunda was the deity of their worship. The terrific figure of Chamunda in association with six other matrika, and some figures of Yogini, Virabhadra, in the dark cella furnish a grim atmosphere suitable for the tantric ascetics. The remnant of a sacrificial post (jupa) in front of the temple further attests that human and animal sacrifice was practised in the temple. The outer surface depicts a number of cult deities and secular figures the importance of which are a four-handed Durga flanked by two attendants on the southern side, Ardhanariswara, in the western bada, a Mahisamardini image in the northern central niche and many other figures of iconographic importance.

Mohini temple (C. 8th Century)

The temple of Mohini situated on the southern bank of Bindu Sarovara was erected by Mohini Devi the queen of Bhaumakar king Subhakara Deva-II to perpetuate her memory in pursuance of the tradition of her mother-in-law Madhavi Devi. The queen of Subhakar Deva-I built the temple of Madhabeswar at Biraja after her name. The temple is devoid of much workmanship. The Parsadevata—Parvati, Kartikeya and Ganesh, are in proper position. The presiding deity of the temple is a ten-armed dancing Chamunda, locally known as Mohini, showing in her right hands sword, dambaru, bunch of flower, axe and one in varada mudra, and in left hands dhal, kharpara, human head, one touching the canine teeth, others not traceable, emaciated belly, drooping eyes, seated on a corpse, Brishava as Vahana. The Brishava Vahana of Chamunda is never seen in cases of Chamunda so far noticed in Orissa. In the Jagamohan we come across a six-armed Mahisamardini in style and execution similar to that of Mahisamardini of Vaital and Sisireswar but in contrast is six-handed rather than eight-handed which appears to have belonged to earlier date.

The Uttereswar temple on the northern edge of Bindu Sarovara contains an image of Chamunda. Here we may refer to Swarnadri mohadaya which indicates four images of Chandika on the four sides of Bindu Sarobara. The image of Chamunda in the Mohini and Uttereswar temples, Mahisamardini in the western bank and another Mahisamardini on the eastern bank known as Dvarabasini.

Gouri Temple

Another important Sakta temple of Khakhara variety known as Gouri temple is situated to the west of Kedar Kunda at Bhubaneswar. The temple is named after Tribhuvana Mahadevi, a queen of Bhauma dynasty, who proclaimed her as Siddha Gouri in the closing version of her copper plate grants. She was the queen of Subhakara and the mother of queen Dandi Mahadevi who also assumed the name of Gouri and ruled for some years after the death of her husband. In the copper plates she is described as the incarnation of Gouri or Parvati and she built the temple of Gouri at Ekamrakshetra. On the basis of the date of Ganjam plates of Dandi Mahadevi issued on 794 A. D. the date of the temple is assigned to the last part of 8th century A. D.

The temple is built of Rajrania variety of stone and is Pancharatha in plan but the plinth resembles that of Triratha pattern. The Jagamohan has been erected recently and the Vimana repaired and plastered.

The figures of importance in the temple other than the presiding deity, Gouri are Ganga and Yamuna on their respective vehicles, Makara and Kurma. The temple stylistically resembles the temple of Mukteswara particularly in points of female figures standing in front of the door, the dwarfish figures attempting to uplift the structure, etc. It may be pointed out here that this temple stands in transition in between the temple of Vaital and Mukteswara bearing the characteristic features of the both. The temple is heavily plastered and hence the sculptures depicted in the body can not be examined.

A concocted story depicted by the eminent Oriya poet Radhanath Ray deals with the love affairs of Kedar and Gouri. Kedar, the presiding deity of Kedar temple in the same compound is taken as hero and Gouri as heroine. The story runs as follows :—

> The beautiful city was established by Lalata Keshari on the summit of Himachala. The palace encircled the Bindu Sarovara tank followed by hamlets and most of the area was full of deep jungle. In this city there lived a young man Kedara and maiden named Gouri. They were extremely handsome and loved each other from the childhood. Although they were neighbours, they could not mix with each other due to a high wall raised in between the two houses. The parents of both were at daggers drawn and hence did not allow the boy and girl to mix with each other. The wall had a small hole through which they could faintly exchange words only after evening shedding tears for the impediments stood on their way of love-making. However, they continued to maintain their relationship in this way. After some time they decided to leave their houses with an understanding that they would meet at the spring and finally leave for other place. Gouri slipped away from her house first, proceeded to the prescribed place and waited for Kedara. Suddenly a misfortune befell her. A ferocious tiger came roaring with her nails and teeth tinged with fresh blood and at the sight of the animal Gouri ran to hide herself in a cave. While running her scarf fell down. The tiger after drinking water from the spring saw the scarf and cut it into pieces with his blood-stained teeth. After sometime Kedar came there and was terrified to see the footprints of the tiger and blood-stained scarf of Gouri. He thought that Gouri was killed by the tiger He was at a loss to decide to the course to be followed. In a mood of frenzy he plunged the sharp dagger into his heart and fell. In the mean time Gouri came out of the cave in search of Kedar and found him dying in pain. Kedar saw her for a moment and breathed his last. Gouri also lost her life in the way her lover did.

The king Lalat Keshari visualized the event in dream and in the morning he rushed to the spot and was shocked to see the dead bodies of lover and beloved. Under the orders of the king the dead bodies of Kedar and Gouri were burnt at the spot and as a mark of death of the two noble souls the temples of Kedara and Gouri were built. The love story thus ended in tragedy. The story does not have historicity, but it adds charm to the sanctity of the place.

Parvati Temple

The magnificent temple of Parvati or Bhagabati in the courtyard of Lingaraj, the last Sakta shrine at Bhubaneswar signifies the Sakta influence and its correlation with Saivism. The temple like the Ananta Vasudeva has four adjuncts. Prof. R. D. Benerjee considered it to be contemporary of the Lingaraj. But K. C. Panigrahi identifies it as the work of the Ganga epoch. According to him the differences in the art and architecture of both the temples are, however, so obvious that they cannot possibly be taken to have belonged to one and the same period. The temple of Parvati stands on a high plinth, but that of Lingaraja rises abruptly from the ground level. The Parvati temple is Sapta-ratha in plan, while the Lingaraja is Pancha-ratha. As apparent from the same type of stone and the continuity of the same type of decorations, all three chambers forming the frontal complex in the Parvati were built along with the sanctum, but in the Lingaraj, the Natamandira and the Bhogamandapa represent later additions. The sculptures, particularly the scrolls in the Parvati temple, are typical of the Ganga epoch, and when they are compared with those of the Ananta-Vasudeva, the Chitresvara, the Sari Deul and the Yamesvara, most of them are found not only similar but also almost identical. The overcrowding of too many decorative designs in all available spaces of the walls is a characteristic of the art in the Parvati temple, which is not to be noticed in the great Lingaraja. The art of the Lingaraja is noted for a bold execution of the decorative designs and their judicious spacing, while that of the Parvati is remarkable for the minute decorations, chiselled with great precision, resembling the carvings on the ivory or woodwork which, on account of their exuberant details, seem to lack a sense of space (Fig. 79-80). These are the obvious differences between the art and architecture of the two temples and so, the temple of Parvati with all evident characteristics of the Ganga monuments can be placed in the Ganga epoch, probably a near contemporary of the Ananta Vasudeva.

This is in short with regard to the Sakta shrines at Bhubaneswar. But Shaktism was not confined to the above-noted temples alone but sporadically spread to all other temples at Bhubaneswar and in other places. All the temples built in the sacred complex at Bhubaneswar in a long span of one thousand years profusely depict the females in the form of presiding deities, Paraswa devatas, Apsaras, Yoginis, Naiykas, Surasundaries, Gandharvis, Ereotic figures, Shaktis of various deities, multitudes of secular figures in panels depicting the day-to-day social life, etc. which mark exuberence and preponderance of Sakta-Tantrism at Bhubaneswar.

Superintendent,
Orissa State Museum,
Bhubaneswar.

IPICOL

THERE IS A FORTUNE IN YOUR FUTURE
and we can help you make it.
All you need is a little capital, lots
of determination and every kind of
help—from IPICOL

INDUSTRIAL PROMOTION AND INVESTMENT CORPORATION OF ORISSA LIMITED

(A GOVERNMENT OF ORISSA UNDERTAKING)
3-A, SATYANAGAR, BHUBANESWAR-7

Tel : 50120

Telex : 0675-204
Grams : IPICOL

The Task before the Scientists and Engineers of India

⁂

PROF. P. K. JENA

In a developing country like India, the responsibility and role of engineers are much more than those of a developed nation. Because in a developing country besides taking the burden of setting up various industries and creating infrastructure, one has to convince the common people, policy makers and administrators at every stage regarding advantages of applying science and technology in various walks of life. In our country most of our common people have not yet developed faith and confidence in the ability of our scientists and technologists, because so far most of our scientific and engineering findings have not been utilised properly for their benefits. As a result of this, people are continuing to have a fancy for foreign goods, foreign technology and foreign expertise. Therefore, our scientists and technologists have to make double effort for creating confidence and hence a favourable atmosphere for indigeneous and appropriate technology. They should take the fruits of science and technology to the doors of the rural people who constitute about 80 % of our total population. When our village folk will be able to utilise science and technology to produce more food, build low cost houses and get clothings at a cheap rate, abundant water for irrigation and drinking purposes, electricity, etc., then only the socio-economic condition of the country will improve. Scientists and engineers should take up more and more developmental and industrial projects in rural areas instead of directing these projects from their offices in urban areas. As a matter of fact they should work on the spot with the villagers and for the villagers. Then only they can win the good will and confidence of the village folk.

Though there has been considerable progress in the industrialisation of the country, yet considering the huge and varied needs of its increasing population, a lot more has to be done by utilising its so far unutilised and untapped vast natural resources. India is one of the few nations rich in ores and minerals like iron and manganese ores, bauxite, ilmenite, monozite, chromite and sillimanite. From the energy resources point of view, it is today in a much more comfortable position having a good reserve of coal, petroleum and hydro-electric power. It is also endowed with vast forest, marine and water resources. Our country is surrounded by seas on three sides, about 30% to 40% of its geographical area is covered with forest and a large number of rivers flowing over the fertile lands of the country. It is threfore the foremost duty of the scientists and technologists to impress upon and advise to the policy makers and assist actively in programming and implementation of various projects for utilisation of these natural resources for the socio-economic development of our people.

It may be appropriate to mention here the urgency of developing indigenous and appropriate technology. Many times it has been our experience that the technology borrowed is not up-to-date and again if the process is a sophisticated one we have not only to pay for the process know-how but for the equipments, spare parts, expertise, etc. Further we may not have enough background to bring development on these processes and as a result, we have to depend on the foreign party for all time to come. Whereas a technology which is indigenously developed, is likely to be up-to-date and may be easy and also will generate enough technical expertise to translate it. As the socio-economic conditions of our country is very much different than those of a developed nation, the technology has to be an appropriate one. For example, an energy intensive process which has been successfully developed and commercialised in a country where the electricity is very cheep when duplicated in India, may result into an unsuccessful and costly one. Take for example, a process of making sponge iron by using natural gas may be viable in U. S. A. or Middle East but not in India as natural gas is not abundant and cheap in this country. Again sometimes when we import a mechanised and sophisticated process for setting up an industry, we also face the difficulties in procuring the various spare parts and also proper utilisation of our man power. Therefore, it is very essential for our scientists and engineers to develop appropriate and indigenous technology and set up industries by utilising our own resources and man power. It is not that we have to produce each and every thing what our people need, but the essential and defence items as much as possible should be made in the country.

Another important role our scientists and engineers have to play is to conserve the natural resources as much as possible and make the best use of the resources. It is a very sorry state of affair that today in many industries, particularly in the mining industries, we are not very much careful in proper mining and often we have been very much negligent in storing th lean and off-grade ores which are going to be the main source of our future requirement of metals, alloys and refractories. In most of our industries very little effort is made for utilisation of industrial wastes and by-products. Here the technologists have to do a lot for developing new processes for utilising these wastes and by-products, and bringing better economy to the existing units and also giving employment to many through setting up small industries.

In a competitive world of to-day, it is not enough to just produce something. The products should be of quality grade so that those can have demand inside as well as outside the country. The Scientists and engineers should evolve various techniques to manufacture standard products and to check the infiltration of the substandard items to the market. In this regard the industrialists should be properly educated. One bad product in the international market will spoil the image of the whole nation.

During the years to come to meet the needs of our growing population we should have more and more industries in various sectors. To run these industries efficiently we want trained personnel. The nation has a tremendous task in chosing the right people and training them in a proper way so that they will be confident and able in setting up and running our industries and developing various infrastructures. Here it may be mentioned that the present system of teaching in science and engineering in the country should be completely changed to more applied oriented one and in-plant training.

While taking the nation in the path of industrialization, they should not lose sight of the growing pollution problem. They have to keep always in mind the colossal amount of harmful and poisonous materials in the form of solids, liquids and gases coming out from our houses, industries and power plants, which will be gradually polluting our land, water and air. We should give equal importance to this problem and take necessary measures for disposing the wastes and pollutants. The industries should be told to take various measures in co-operation with the government and public to keep the land, water and air free from pollution.

When a nation is conscious of the above facts and acts accordingly, is bound to march ahead in its agricultural and industrial programmes and would bring rapid socio-economic development. To bring the fruits of the science and technology to the doors of the common people, the scientists and engineers have got a great role to play in this regard.

Director
Regional Research Laboratory
Bhubaneswar and Member, State
Planning Board, Orissa.

◆

AMBITIOUS PROGRAMME FOR VEGETABLE PRODUCTION

An ambitious programme has been undertaken by the State Government to intensify production of improved varieties of seeds and different vegetables in the State during 6th Plan period.

The area under potato in the State has stagnated around 7,000 hectares with an annual yield of about 60,000 tonnes. The average yield being low due to use of inferior seeds, emphasis is laid on improved varieties and extend the area of potato cultivation to at least 10,000 hectares by end of 6th Plan. Small farmers in the dugs-well ayacuts are encouraged to take up potato cultivation. The total area under vegetables in the State comes to 4·67 lakh hectares with an estimated production of 29·62 lakh tonnes annually. Due to lack of irrigation facilities, the area under vegetables during Rabi season is about 50 per cent of the area during Kharif. A programme has been formulated for extention of area under vegetables particularly through kitchen gardens around townships and industrial areas.

The tribals of the State have a marked preference for tuber crops. To encourage them to take up high yielding variety, planting materials of popular tuber crops are grown in the departmental farms. The Central Tuber Crop Research Institute has set up a tapioca research and quarrentine Centre near Bhubaneswar where imported tapioca is raised and released. An adoptive Tribal Centre has been set up at Phulbani to concentrate on special requirement of particular fruit and vegetable crops.

A number of Community Canning and Training Cenntres have been set up in the State where preservation and processing of fruits is done and the local people trained about techniques. This enables the cultivators to obtain a better price for their products and ensure availability of products during offseason. The Community Canning and Training Centres have gained much popularity.

ON THE AUSPICIOUS OCCASION OF

DURGA PUJA

WE CONVEY OUR BEST WISHES
TO OUR READERS AND WELL WISHERS

THE SAMAJ

MASS CIRCULATED ORIYA DAILY

ESTABLISHED : 1919

Founder : **UTKALMANI GOPABANDHU DAS**

GOPABANDHU BHAWAN
BUXI BAZAR, CUTTACK-753001

GRAM : SAMAJ

PHONES **20994, 21044 & 20183**

RANDOM RAMBLING

SHRI R. C. SEKHAR

"I See The Better Course : I Follow The worse"

—OVID

It happens because seeing may be wisdom but following is necessity. I am painfully aware of the difference between my vision and my capability, the difference between what I ought to do and what I am ultimately dragged to do per force. I am so candid in my admission, dear reader, because I know how sincerely you too share my view. The forces we are born to contend with are so very wild and unpredictable and the times we live in are beset with such uncertainties that we are virtually thrown around like little palythings. We are, to these forces, what slaves have been to wanton kings !

How I wish I could be like the thousand others around me who never bother to see any course better or worse. They drift merrily along and never know that they drift. Life for them is a sleepwalking either in pleasure or in pain. They have no fixed value to disturb them constantly, no desire either to resist the forces that, push them helter skelter. Broadly speaking, they never face a crisis of choice, since a sublimer alternative to what happens to them never floats into their ken. They are definitely the happier lot who have learnt to accept what comes on their way and not to question its value either on ethics or aesthetics.

Conflict they have none. They choose to serve a person whereas, I serve a principle. The person is easily pleased and a course of least resistance yields a rich dividend. To live by a principle, on the other hand, is the desire of a moth for the star. The pity is that I do exactly what the other man also does with pleasure, but I alone pine for what is not. He serves his master. He serves his times. Why need he bother to see an alternative. I too serve my master, per force, knowing fully well that he is a scoundrel and just happens to sit on my head by a mere cast of the dice. I too serve my times, but grinding my teeth like an unwilling slave in chains.

The difficulty, therefore, is not so much with the times as with my own self. The pity is that I see more than I need to see. I always get the vision of something better than what I am forced to live with. I spilt myself between two worlds, thereby doubling my miseries of not realising my dreams and not living fully the life that has fallen to my lot. All my values float away and out of my reach leaving me in despair, with a life full of trash where I do and say meaningless nonsense. I always feel that I am weltering in mud, whereas I ought to be soaring in an unchartered sky. I suffer because I see. I suffer on account of a duality of vision. Perhaps the one and the only one possiblility is the actual and that which flashes out, over there, and tempts me as the sublimer alternative, and as the better course, may be, after all, just a mirage.

I should either have the courage of conviction to pursue my ideal or should have the basic commonsense, while at Rome, to do as the Romans do.

Unit—IX Flat
Bhubaneswar

With best compliments from:

HINDUSTAN AERONAUTICS LIMITED
KORAPUT DIVISION
P. O, SUNABEDA-2
DIST. KORAPUT

Career and achievement of a British Servant in Orissa

*

SHRI P. K. MISHRA

The British occupied Orissa in October 1803. It was an easy earned occupation. Very many factors are responsible for this. Mostly the natives of Orissa were the first and foremost to invite the British to our land. Amongst them was one Sheikh Waz Muhammed.

Sheikh Waz Muhammed was the younger brother of Sheikh Futteh Muhammed, the Maratha Faujdar of Malud. Prior to the actual invasion of Orissa, in August, 1803, the British officers made an agreement with the latter in which, he promised to be a friend of the British and agreed to give all facilities to the best of his capacity in the occupation of Orissa and supply provisions to the army. In fact, the first to give their submission to the British Government were these two brothers. As per the agreement the elder brother remained at Malud and rendered every assistance to the English army in supplying it with forage. The younger brother, Sheikh Waz Muhammed was sent to attend the English army and to assist to the utmost in his power in making a political settlement of the country. But for his presence and assistance, occupation of Orissa would have been a very difficult task for the British. In fact, Sheikh Waz Muhammed did most important service in crossing the troops over the Chilka lake and landing a detachment from the ships, and accompanied the army to Cuttack. His exertions and eminent services were highly appreciated and estimated by the British authorities in Fort William. The Commissioners for the affairs in Cuttack granted the jagirdarship of Malud to Sheikh Futteh Muhammed, and also instructed him to give a suitable allowance out of the proceeds of the jagir to Sheikh Waz Muhammed. Eventually, after prolonged litigation the younger brother succeeded in procuring an allowance of Rs. 100 per month from the jagir.

After annexation of Orissa, the British authorities first faced a severe resistance from the Raja of Khurda early in 1804. With him joined the Rajas of Kujang and Kanika, and the paiks of these three estates and of Banpur. By December, 1804 situation was alarming. The subjugation of Banpur was undertaken first, so that the Banpur paiks might not join the force of the Raja of Khurda. Therefore, Colonel Harcourt, the Commissioner for the affairs in Cuttack appointed Sheikh Waz Muhammed as the Amil of the rebellious pergana of Banpur and entrusted him with the task of reduction of that area. He was also promised a salary of Rs. 500 per month for his job after he succeeded in it. In fact he performed his duty in a satisfactory manner. In early January 1805 he captured the fugitive rebel

Raja Mukunda Dev of Khurda and his followers. For his such service to the British he was granted a reward of Rs. 3,000.

In 1814 he was appointed Sheristadar in the office of the Superintendent, Tributary Mahals, Cuttack with a monthly salary of Rs. 80. In January, 1817 there appeared a great danger to the British authority in Orissa due to the incursions of the Pindaries. So Seikh Waz Muhammed, the Sheristadar was deputed to attend a force under Major Hamilton who was sent to protect the frontiers His services there, were highly appreciated by the authorities.

His next most important work was accredited in 1825. It was in connection with the capture of Buxi Jagabandhu. In March, 1817 there was a great paik rising in Khurda particularly, and in Orissa in general. The rising continued for long seven years. Buxi Jagabandhu Bidyadhar and Krishna Chandra Bhramarbar were the two most important leaders among the insurgents. The British authorities took all steps to bring these two leaders under submission, but in vain. At last in May, 1825 Sheikh Waz Muhammed was sent to Nayagarh to effect the surrender of the Buxi only . On 25th May, 1825 he was able to induce the Buxi to surrender himself, and on 27th May, 1825, he reached Cuttack accompanying that rebel leader. For this eminent and most admirable service he was granted a reward of Rs. 1,000.

Although he did many good services to the British Government in Orissa, Sheikh Waz Muhammed earned a very bad name as Sheristadar. In 1832 being accused of corruption, he was placed under suspension, but was reinstated in 1834 by the orders of J. Master, the Commissioner of Cuttack, as no criminality was found againt him. Most astonishingly, H. Ricketts, the Commissioner of Cuttack, in January, 1839 brought his good services to the notice of the Governor General in Council. He pleaded that "this old Gentleman........ has performed good service when it was most required........and I think he is fully entitled to the distinction I have solicited for him". Ricketts therefore, recommended that the title of Khan Bahadur should be conferred on him, along with a personal allowance of Rs. 50 per month. Subsequently Sheikh Waz Muhammed was invested with the title of Khan Bahadur by the orders of Government of Bengal, dated the 30th March, 1840. Next he was promoted from the position of a Sheristadar to that of a Dewan in the Office of the Superintendent, Tributary Mahals, Cuttack.

Khan Bahadur Sheikh Waz Muhammed served the British Government as a loyal servant till the end of October, 1845. During a period of five years from 1840 to 1845 his health gradually deteriorated. He suffered from asthma and hernia as a result of which he became physically infirm to discharge his duties. Under such circumstances he was forced to apply for a superannuated pension. A life pension of Rs. 83-9-7 per month was granted to him with effect from 1st November, 1845. Thus he retired from British Government service at the age of 68.

Even after his retirement, the British Government could not forget him. His services were again requisitioned in 1846, to subdue the rebel Raja of Angul. Khan Bahadur Sheikh Waz Muhammed then brought the Raja Somanath Singh 'to a proper sense of duty'. The Raja in fact, accepted the terms of the British Government and liquidated the fine imposed upon him.

Summing up the British Government were really obliged to these *Muhammed Brothers* who had rendered very valuable and timely service to them. On the other hand, these two brothers were rightly honoured and rewarded for their most loyal service rendered to an alien Government.

●

Research Assistant,
Department of History Utkal University,
Vani Vihar, Bhubaneswar.

ENERGY OPTIONS—SOLAR ENERGY

SHRI DEBAKANTA MISHRA

Abundance of this non-depleting source

The Sun, the tides, the rivers and waves of the sea, the natural growth of plant life, the earth's internal heat can all be used as energy sources. They are very often classified together as 'non-depleting' energy sources. But this is not scientifically true. Only the Sun, wind and the waves remain unaffected by man's use and are truly non-depleting over centuries. The most tantalizing feature of the Sun's energy is its abundance. The Solar flux at the outer edge of the atmosphere is 1·4 kilowatts per square metre. Although this is reduced due to absorption and reflection, about 50 per cent of it reaches the earth's surface. The midday intensity of solar energy on a clear day in the tropics can exceed a kilowatt per square metre. This energy falling on an area about 8 kilometers square is equivalent to the output of the whole of the United Kingdom's electricity generating system. Moreover, the desert areas of the world extend over 20 million square kilometers. On this area of land, which grows no food, and supports no population, the total annual solar radiation is about 400 times the world's present energy consumption of all varieties. This obvious superfluity of energy' with no known way of collecting more than a very tiny percentage of it makes solar energy research very challenging. At present a fierce struggle is emerging between those who want to rapidly develop solar energy for mass use and those who are skeptical of its ability to become a major source of power in this century.

Historical Significance

In fact, solar power is an ancient idea. The Greeks and Romans were very familiar with the Sun's potential power. Archimedes, in 212 B. C. made use of reflections from hundreds of polished mirrors to counter a Roman naval attack. Syracusan soldiers focussed the glare of their shields on one particular ship in the Roman fleet and eventually ignited an inferno. It is also known that Vestal Virgins of Rome used solar rays focussed by metal cones, 500 years before our era, to kindle fires in their temple on the Forum. More recently, about a century ago, John Ericsson, the Swedish inventor of the Civil War iron-olad Monitor, built a successful steam engine that ran on solar energy.

Towards the last part of the nineteenth century solar land marks followed in rapid succession. In 1877, an iron solar heater was used to warm a house—a fan below hot air across it and into the structure. A solar printing press was shown to the public at the Paris Exhibition in 1878. A desalination plant was erected at Chile to provide 6,000 gallons of fresh water a day for a nitrate mine. It ran entirely on solar power. At the turn of the century, an enterprising Bostonian travelled west and used solar energy to activate an engine that can pump water on a Pasadena Ostrich farm. This marvellous device could pump 1.400 gallons of water per minute for 12 hours a day. A few years later, a Pennsylvania engineer, Frank Shuman, built a four-acre solar steam plant. This plant was built at a cost of 2 lakh of rupees and was 10,000 feet in length. Shuman then built a 55 horse-power solar pump on the banks of the Nile. Shuman not only proved himself a pioneer in this field but also he acted as a prophet. Unless solar power is fully developed, he warned, "We shall have to revert to barbarism because coal and oil will be used up".

Keeping pace with the development of science, technology advanced very rapidly in this century. Natural gas and oil were made available at relatively cheap rates. Thus interest in solar energy developed. For years, the only research on solar energy in an industrially advanced country such as U. S. was done by a handful of poorly supported scientists and engineers.

A Solar Awakening

In the meanwhile all that has changed. The watershed year was 1973 when the oil enbargo and subsequent energy crisis convinced both the rich and poor nations of the world that we face a problem of major proportions. The world's oil and gas supplies are running out. What is going to replace them ? If we exclude solar or solar driven resources (such as wind and tidal power) the options are so limited that the future of this technology based civilization appears dark. What is the alternative technology ? To get a satisfactory answer to this question, quite naturally, the entire world attention is now focussed on solar energy, which is in fact the primary source of all our energy. Moreover, it is the cleanest, most pleasant and potentially cheapest amongst all alternate sources.

Although solar power has a global significance, it has great relevance to our country's needs. We are fortunate to get this energy in abundance because of suitable geographical location of our country in the tropical region.

Accelerated Development of Technology

Achieving a solar future will entail hard struggle, not only against technical difficulties, but against entrenched ideas and vested interests. Nevertheless, despite difficulties, problems and obstacles, and initial expense varied forms of technologies are maturing very rapidly. A modest attempt is made here to enumerate a few amongst these most viable forms of technologies. The most challenging complex and urgent need of the day is to bring solar energy's cost and efficiency to a point where it is an economical energy alternative in widespread use, and to foster creation of a viable, commercially independent solar energy industry.

1. Solar Concentrators and Solar Heaters.

(a) Flat Plate Collectors—These are the most economical and dependable suncatchers on the home market. Flat plates, as their name implies, are flat pieces of metal, usually steel, copper or aluminium, painted blue and enclosed in a glass-topped box. Its simple mechanism is that on sunny, or even moderately overcast days the Sun's light comes steaming through the glass, hits the plate and is turned into heat. But heat radiation does not pass readily through glass and so remains trapped inside. If the box is well insulated, the temperature starts to climb inside the collector, getting close to 200°F even in the dead of winter.

Air or water is then forced through the heated chamber and can then be directed into the house's heating system for immediate use, or stored in a pool (made of water, rocks, or special 'eutectic salts') for future use. Solar hot water heaters are the most popular items in the market place in the industrially advanced countries. An ordinary solar heater costs between 1,500 and 2,000 dollars, installed.

(*b*) *Solar Homes*—Heating house with solar power is more complicated. The 'Trombe Wall' is an interesting way of controlling thermal behaviour of a building. Its principle of working was developed by professor Felix Trombe and the architect Jacques Michel. Trombe Walls have been incorporated in some houses built in the French Pyrenees. A glass sheet is fixed in front of a well facing the Sun. The wall absorbs heat and in turn heats the air in the gap between wall and glass causing it to rise. To cool the building the bottom flap in the glass sheet is kept shut and the top one opened. The heated warm air flows upwards, and drawn cool air into the home from the shaded rear. To heat the building the top flap is closed and the bottom left open.

(*c*) *Storage for large scale using, Solar Pond*—Solar pond has been developed by Tabor in Israel. The pond is about a meter deep with a black heat absorbent bottom. The lower part is filled with concentrated brine and over this is cerefully poured a layer of ordinary water; the difference in density prevents the two from mixing. The brine is heated by its contact with the heat absorbent bottom, but because of its high density it remains trapped below the water which acts as insulation. High temperatures of the order of 100°C have been reached by this method. But drawing off heat can cause turbulence and mixing of the layers. To avoid severe heat losses around the edges, the pond needs to be quite large. It is, of course, now in operation, taking several days of bright sunshine to reach maximum temperatures.

(*d*) *Heliostats and Air-conditioners*—Solar concentrators can obtain intermediate levels of heat (200—500 degree F). They can be built with heliostats. The heliostats are devices which automatically turn the the collector towards the sun like a sunflower. The sun's rays are then focussed on a circulating fluid. But such devices are more expensive than simple flat plates.

Commutators are the essential parts of solar air-conditioners. These devices use heat exchangers similar to those found in standard refrigerators. In fact, models of solar coolers are already operational, but the cost is prohibitive.

(*e*) *The Heat Pump*—The final way to improve the chances of the flat plate collector is to co-ordinate its function with another machine known as heat pump. The amazing machine is an electric-powered device that is already used in almost a milion American homes for space heating. It is simply a device for moving heat against the current in the thermal sense, i.e., heat moves from a cold place to a hot place. In the case of space heating, the heat being moved is extracted from the out-of-doors, specifically, from the Sun derived heat present in any outside air that is above absolute zero. In a sense, the heat pump is a solar device. It has been found that the efficiency of the heat pump falls sharply when the outside temperature falls below 20 degrees F. However the pump works beautifully if it can draw heat from water or air warmed to a modest 50°F by flat plate collectors. One of the largest solar buildings in the world, a new 25,000 square feet building in New Mexico State University has a hybrid system. Its designer, Frank Bridgers, a well known engineer in solar heating circles, plans to incorporate such systems in larger buildings.

2. Chemical Methods

(*a*) *Heat Storage*—These methods rely on the heat absorption during a change of state from liquid to gas or from solid to liquid. When for instance, ice melts, a large amount of heat is absorbed without any rise in temperature it takes about 80 times as much heat to turn a quantity of ice into water as it does to raise its temperature the last degree—1 degree C to 0 degree C. When the ice reforms this latent heat is given off. For solar heat storage a substance is required which melts at the temperature reached by water from a flat plate collector, and which can then easily be stored at that temperature. The most promising substance investigated thus far is Gaubers Salt, i.e., sodium sulphate. It melts at about 32 degree C, dissolving in its own water of crystallization and absorbing about 67 watt-hours of energy per kilogram. So, one kilowatt-hour energy storage would require about 15 kilograms of this salt. When the liquid is cooled slightly it recrystallizes, giving off this heat. It is obviously an extensive method of energy storage. So far such investigations are of laboratory interest only.

(*b*) *Solar Cells*—Photovoltaic cells—'Solar cells' for short—also are available, which convert solar .energy directly into electricity. Solar cell uses a carefully manufactured crystal, usually of sillicon, in which a small electric current can be produced when it is lit by light of correct energy level. These crystals demand high precision manufacture. They must be made of sillicon purified to one part in a 100 million and then doped with an impurity, such as boron, to one part in a million. Sillicon solar cells have been extensively used in space programmes, but they cost about 2,000 to 5,000 dollars per kilowatt of output.

Photovoltaic cells have no moving parts and are consequently extremely reliable and quiet. They are easy to operate. The space age electronic marvels are also environmentally most benign source of electricity yet known. Many solar experts are now trying their best to make these cells much cheaper or more efficient or both. This could have a profound impact in our lives and economy, as every house could contain its own private 'electric company' on its own roof or in the window.

Some proposals to solve energy crisis using solar cells.

(*i*) *Aerospace research*—To meet the evergrowing need for energy, American Scientists are examining the possibility of launching solar-power satellites in space. Each comprising a hundred square kilometres of solar cells, the satellites would gather energy from the Sun and beam it via microwaves to receiving stations on earth. Scientists predict that by the year 2025, the Sun would supply 25 per cent of Americans' power needs.

(*ii*) *Covering large areas of desert with solar cells*—Calculations have been made which shows for instance, that U. S. electrical energy consumption in 1970 was equivalent to solar radiation falling on only 400 square mile of desert. If they could be tapped at only 50 per cent efficiency, just 8,000 square miles of desert would be required.

Of course much large scale applications of photovoltaic cells at the present state of development of this technology is yet within even the remotest bounds of technical or economic feasibility. Many scientists and technicians characterize photovoltaics as a long range option with significance only in the next century.

Can Indian Scientists harness the Indian Sun ?

Research on solar energy in India is as sophisticated and intensive as any where in the world. As long ago as 1950, the National Physical Laboratory started research on solar energy. The Government of India recently integrated the research and product development effort to eliminate duplication. Government of India's threefold programme consists of the following:—

(*i*) the development of direct energy—conversion devices (such as photovoltaic cells);

(*ii*) the development of solar energy hardware;

(*iii*) the development of solar energy data collection centres.

Under the jurisdiction of the Ministry of Science and Technology and the Ministry of Energy these activities are being coordinated by HEL, Central Electronics Limited and the Indian Meteorological Department.

For direct energy conversion, Indian Scientists are aiming at designing photovoltaic cells made of two thin layers of materials, of which one is a semiconducting material such as sillicon and the other is a metal like silver or aluminium. In these cells sunlight stimulates the flow of electrons to generate electricity. However, as in U. S. these cells are too expensive to compete with conventional sources of energy.

Indian Government has given top priority to six major projects such as (*i*) Solar energized water pump, (*ii*) Solar power stations, (*iii*) Solar desalination plants, (*iv*) Solar air-conditioning units, (*v*) Solar water heaters and (*vi*) Solar home heating units.

Solar water pumps having capacity between two and five horse powers are being developed principally for use in rural areas. These pumps are now being tested. Such pumps have no recurring power expenses and it is expected that one such pump will last for more than ten years. The solar power station project hopes to develop a minipower unit that can be used in rural Indian to collect solar energy and to transform it to electrical energy for lights, small machinery, etc. In one such unit, which is almost in the completion stage, solar energy will be collected to produce steam and this steam power would then activate a turbine to generate electricity. Central Salt and Marine Chemicals Research Institute, Bhavnagar, has produced a successful prototype of solar desalination plant. This project which is meant to benefit countless people, is now confined to the laboratory. Three major designs for solar heaters have been perfected. However, since the cheapest among these costs more than 3,500 rupees, it is still beyond the reach of the average consumer. The University of Roorkee is testing a heating-cooling system and Bharat Heavy Electricals Limited Workshop at Hardwar is being heated by a solar system. Many research centres such as Forest Research Institute, Dehra Dun have produced prototypes of solar dryers. These devices are meant to dry uniformly and hygienically agricultural produce such as rice, wheat, chilies, corn, dry fruits, tea and timber.

The Future

Thus, the solar energy programme is forging ahead with support from the Government industry and private institutions. It is needless to say that solar energy is potentially very important for India with its 50,000 villages, as solar power technology is not likely to have significant economics of scale. This will enable Indian villages and villagers to have their own power plant, and to help themselves without waiting for others to establish power plants and transmission channels. However, as we have discussed earlier, solar power technology has yet to be made economical This may not be expected to happen befor the turn of this century. It is hoped that the use of solar energy for air-conditioning and pumping may become economical much sooner. The large scale use of solar energy for air-conditioning and pumping may become economical much sooner. The large scale use of solar pumps has the potential to lower the demand for electricity by 5000 MW in 2000-01. This is around 4 per cent of the predicted total requirement for electricity which is small, though not insignificant.

With the rapid advancement of technology relating to the use of solar power as one of the most viable, alternative energy source of the future, it is obeserved all over the world that it exerts a peculiar appeal on the public. This non-depleting energy source is clean, efficient and once the collecting equipment is paid for—as free as anything can be. Daniel Behrman very aptly writes in his recent book 'Solar Energy "Of all the remotely possible large-scale replacements for petroleum, it is the only one with grass roots support."

Reader in Physics,
Ravenshaw College
Cuttack.

ରାସାୟନିକ ସାରର ଦର

୧୦-୩-୧୯୭୯ରୁ ବିକ୍ରୀକର ଓ ଅନ୍ୟାନ୍ୟ କରବାଦ୍ ପ୍ରଚଳିତ ସାରର ଦର

(୫ କିଲୋ ପର୍ଯ୍ୟନ୍ତ
ଖୁଚୁରା ବିକ୍ରୀ ପାଇଁ)

ସାରର ନାମ		ଟନ ପ୍ରତି ଦାମ	କିଲୋପ୍ରତି ଦାମ
		ଟଙ୍କା	ଟଙ୍କା
୧ । ଆମୋନିୟମ ସଲଫେଟ୍-୨୦ ୧୦୦ କେ. ଜି. ବସ୍ତା	..	୮୫୯·୦୦	୦·୯୧
୨ । ଆମୋନିୟମ ଦଲଫେଟ୍ ୫୦ କେ. ଜି. ବସ୍ତା	..	୯୦୫·୦୦	୦·୯୨
୩ । କ୍ୟାଲସିୟମ ଆମୋନିୟମ ନାଇଟ୍ରେଟ୍ ୨୫%	—	୧,୦୦୦·୦୦	୧·୦୧
୪ । କ୍ୟାଲସିୟମ ଆମୋନିୟ ନ ଇଟ୍ରେଟ୍ ୨୬%	..	୧,୦୪୦·୦୦	୧·୦୫
୫ । ୟୁରିଆ ୪୬%	..	୧,୪୫୦·୦୦	୧·୪୬
୬ । ଟ୍ରିପଲ ସୁପର ଫସଫେଟ୍ ୪୬% (ଗୁଣ୍ଡ)	..	୧,୫୦୦·୦୦	୧·୫୯
୭ । ଟ୍ରିପଲ ସୁପର ଫସଫେଟ୍ ୪୬% (ଦାନ ଦାର)	..	୧,୬୦୦·୦୦	୧·୬୧
୮ । ଏ. ପି. ଏସ୍. ଏନ୍ ୨୦:୨୦:୦	..	୧,୬୦୦·୦୦	୧·୬୧
୯ । ଏ. ଏନ୍ ପି ୨୦:୨୦:୦	...	୧,୫୦୦·୦୦	୧·୫୧
୧୦ । ଡି. ଏ. ପି. ୧୮:୪୬:	..	୨,୨୦୦·୦୦	୨·୨୧
୧୧ । ଜି. ଏ. ପି. ୨୮:୨୮:୦	..	୨,୨୦୦·୦୦	୨·୨୧
୧୨ । ବିଜୟା ୨୪:୨୪:୦	...	୧,୯୦୦·୦୦	୧·୯୧
୧୩ । ଜି. ଏ. ପି. ୧୪:୩୫:୧୪	..	୨,୧୦୦·୦୦	୨·୧୧
୧୪ । ବିଜୟା ୧୭:୧୭:୧୭	..	୧,୬୦୦·୦୦	୧·୬୧
୧୫ । ଏନ୍. ପି. କେ ୧୫: ୧୫:୧୫	..	୧,୩୦୦·୦୦	୧·୩୧
୧୬ । ଏନ୍. ପି. କେ ୧୦:୨୬:୨୬	..	୧,୮୦୦·୦୦	୧·୮୧
୧୭ । ଏ. ପି. ଏସ୍. ୧୬: ୨୦:୦	...	୧,୪୦୦·୦୦	୧·୪୨
୧୮ । ଏନ୍. ପି. କେ. ୧୨:୩୨:୧୬	..	୨,୦୦୦·୦୦	୨·୦୧
୧୯ । ଏନ୍. ପି. କେ. ୧୯:୧୯:୧୯	..	୧,୮୦୦·୦୦	୧·୮୧
୨୦ । ଏନ୍. ପି. କେ ୧୪:୨୮:୧୪	..	୧,୯୦୦·୦୦	୧·୯୧
୨୧ । ଏମ୍. ଓ. ପି. ୬୦% ୫୦ କେ. ଜି. ବସ୍ତା	...	୮୦୫·୦୦	୦·୮୨
୨୨ । ଏମ୍. ଓ. ପି ୧୦୦ କେ. ଜି. ବସ୍ତା	..	୭୯୫·୦୦	୦·୮୧
୨୩ । ସିଙ୍ଗଲ ସୁପର ଫସଫେଟ ୧୬% ୫୦ କେ. ଜି. ବସ୍ତା	..	୫୮୪·୪୩	୦·୬୦
୨୪ । ସିଙ୍ଗଲ ସୁପର ଫସଫେଟ୍ ୧୬% ୧୦୦ କେ. ଜି. ବସ୍ତା	..	୫୭୪·୦୪	୦·୫୮
୨୫ । ଡି. ଏମ୍. ସି. ସିଙ୍ଗଲ ସୁପର ଫସଫେଟ୍	..	୬୧୧·୨୨	୦·୬୨

କୃଷି ନିର୍ଦ୍ଦେଶାଳୟ, ଓଡ଼ିଶା, ଭୁବନେଶ୍ୱର

CHAMUNDA, A MANIFESTATION OF DEVI

SHRI B. SAMAL

Saktism with its origin in the dawn of reflection passed through the process of transformation over the ages and gave birth to 'Devi', all pervasive, all powerful creator, preserver, destroyer of the universe ramifying numerous aspects, malevolent and benevolent, associated with complicated iconographic features and philosophy. The cult developed in multiliniar aspects enriched with philosophy of tantra and associated with the cult of Siva. The Union of Siva and Sakti is considered to be the caluminating point of spiritual march in Sakta tantrism. Saivism and Saktism are two aspects of tantra, believed to have been originated in non-Aryan society with Siva and Sakti as their principal divine being worshipped for power, well-being and so on. In essence Siva and Sakti are the god and goddess of the non-Aryans.

Sociologically it has been proved that in primitive society the clan centered round the women who were essentially responsible to produce, rear up and socialize the young in traditional way. The cultural traits like habits, norms, and behaviours were transmitted through the female. It was in this pre-literate society the maternity held the highest esteem, mother being the central figure of religion. This sociological phenomenon has been attested by the plentiful discovery of female figurines of pre-historic culture in bone, ivory and stones with maternal organs profusely exaggarated. It was in the historical period the female principle slowly and slowly paved its way into the arena of religion evidently predominating the society in the early medieval period. The subject of Sakti cult with its numerous ramifications is extensively vast. Hence my attempt here is to deal with the melevolent aspect of Devi invested particularly in the cult of Chamunda.

The origin of Chamunda goes back to the puranic period when innumerable manifestations of Devi were concieved of with iconographic features, Dhyana, mode of worships, rituals and philosophy. The nomenclature of Chamunda is derieved from the fact of annihilating two powerful demon brothers, Chanda and Munda, the ally of demon king Sumbha and his brother Nisumbha. Durga born out of the energy of all gods associated with their Ayudhas appeared for annihilation of the demons who had terrorised *Svarga*, *Martya* and *Pataia*. She appeared in the disguise of a maidan endowed with lustrous beauty attracting the attention of the demons. the demon king having been coveted at her beauty desired to marry her. Devi replied, 'he who vanquishes her in the battle shall be her husband.' This enraged the demon king resulting in fierce fight. Chanda and Munda appeared first in the battle. At the sight of the two powerful demons in their war cry issued from her forehead a goddess, of terrible countenance with drawn-sword and lasso, bearing a many-coloured skull-topped stuff, decorated with a garland of skulls, clad in the tiger skin, grim with imaciation, exceedingly wide of mouth lollingout her tongue terribly, having deep sunken reddish eyes and filling with region of sky with roars. The deity in this form killed Chanda and Munda bearing the epithet of Chamunda.

Another story in Purana reveals that she rendered to Durga, the invaluable assistance in killing Raktavija, another very powerful ally of Sumbha and Nisumbha. Raktavija posed a great problem to Devi as innumerable demons equal in velour and strength of original one were born from the drops of blood oozing out of wounds of the demon and touching the ground. Ambika at this critical juncture directed her 'O Chamunda; stretch out thy mouth wide, with this mouth do thou quickly take in the great asuras, which are the drops of blood that have come into being out of Raktavija, at the descent of my weapon on him. Roam about in the battle field, devouring the great asuras who sprang from him, so shall this daitya, with his blood ebbing away, meet destruction'.

With regard to origin of Chamunda we find another version in the Purana, Siva enraged at the evil eye of Andhak Demon to his consort Parvati pierced the heart of demon with his spear but to his surprise each drop of the latter's blood created a demon of the original structure. This really ignited the anger of Siva resulting in emergence of goddess Yogesvari from his body. At the same time Vaisnavi, Brahmani, Kaumari, Indrani, Mahesvari, Chamunda and Varahi appeared in the bodies of Vishnu, Brahma, Kumar, Indra, Mahesvar, Yama and Varah. They drank all the blood drained from Andhak's body and finally killed him.

Chamunda according to puranic conception is represented in an appearance reduced to almost a skeleton, flesh dried up showing bones and sinews, shunken eyes, contracted abdomen with hairs rising up like flames and snakes peeping out of them, laughing horribly, exhibiting her protruding teeth and lolling tongue, with garland of skulls, dressed in tigers skin with her vehicle corpose or owl. Sometimes she has an ass for a vehicle or a vulture represented as her banner holding in her two hands skin of an elephant. The Saradatilaka tantra describes Chamunda as holding a spear, a sword, a human head and a skull cup in her hands wearing a garland of skull having a body of blood red colour. Silpasastra prescribes eight, ten, twelves or sixteen arms of Chamunda. The Visnudharmottara describes her with 10 arms holding Musala, Kavacha, Bana, Ankusa, Khadga, Pasa, Dhanu, Danda and Parasu and severed head.

Images of Chamunda are found all over the country especially in large number in Orissa, Assam, Madhya Pradesh. The centres of Sakta Tantrism exhibit either individually or in a group of seven or eight matrukas or in the group of sixty-four Yoginis as in Bheraghat in Madhya Pradesh, Hirapur and Ranipur Jharial in Orissa. But it is peculiar that no where she is depicted in the act of killing Chanda and Munda and devouring up demons. She is always shown mostly in seated pose with other mothers.

In this small paper it will not be possible to describe all the Chamundas so far discovered in India. Hence my attempt will be to give a list of representative specimens with special reference to Orissa. The earliest group of Matrika figures have been represented on the stone slabs at Mathura of Kusan period. The images here are simple in appearance without vehicle. In later period the images of Chamunda showed characterstic features as prescribed in the texts. The figures of Matrika preserved in the Mathura Museum Chamunda are depicted with all heir prescribed Characteristic feature.

The earliest group of Matrika we come across in the temple of Parsuramesvar at Bhubaneswar, all seated in Yogasan pose.

Next in order of chronology we find Chamunda as presiding deity along with other matrika figures in the temple of Vaital also as presiding deity in the temples of Mohini at Bhubaneswar. The eight-handed Chamunda is worshipped as Charchika at Banki. Prachi Valley which witnessed the upsurge of the Saktism preserves even now here and there the matrika figures but never in group with the exuberance of Chamunda as presiding deity and parsva-devatas. The most remarkable figures of Chamunda is seen in the compound of S. D. O. Jajpur which perhaps is the biggest so far discovered in India. Saptamatrikas figures in Dasvasmedhghat at Jajpur, on the edge of the Markandesvar tank at Puri, in the Orissa State Museum, in the Khiching Museum, in Belkhandi Museum, Saptamatrika in dancing pose preserved in Balasore Museum in the temples of Mukteswar, at Gandibedh in the district of Balasore and Chamunda separately in various other places of coastal Orissa with all the characterstic features as conceived by the Puranas clearly reveal popularity and wide distributor of the cult in Orissa. Of the four Sakta tantric Pithas described in the tantras Orda, the present political region was consi-dered to be the first Sakta-tantric Kshetra with Jagannath as Bhairava and Katyayani as Bhairavi.

Of the numerous figures of chamunda available so far in India along with those noted above mention may be made of a figure of Chamunda at Kamakshya in Assam bearing the features like protruding teeth, long tongue raised hair, emaciated body, sunken eyes and withered belly holding trident in and skull cup in her hands, Chamunda at Na-Bhanga, Nowganga grim in appearance seated in corpse with a vulture in right side and a jackal at the left scattered with skull and a few bones indicating her as the goddess of funeral ground, Chamunda in the western facet of Brahmesvar temple holding a trident and a human head standing upon a human body with a jackal biting his head, a figure of dancing Chamunda from Baghaura in the Allahabad Museum and an eight-armed Chamunda on the outerwall of Nilakantha temple, Arthma in Rajasthan holding a cobra, a trisula, a Khatwange with a jackal licking the drops of blood falling from the severed human head associated with a fish in a bowl, the most interesting iconographic features signifying the traits of Panchamakara etc.

According to Agni puruna, there are eight different varieties of Chamunda namely Rudracharchicka, Rudrachamunda, Mahalaksmi, Siddha chamunda, Siddha Yogesvari, Rupavidya, Ksma and Dantura. To these are added two more varieties—Kalika and Kubjika (as given in the Matsya Purana) Rudracharchika is described as six armed, having skull, knife, Javelin, and lasso and holding in two arms the two ends of an elephant skin. The two six-armed images of this variety in the Rajasahi Museum in Bangala Desh and an image of Yogini in the sixty four Yogini temple at Hirapur in Orissa may be labelled as Rudra Charchika. Rudrachamunda is eight-armed having a human head and a kettle drum in addition to the attributes of Rudra Charchika. Some of Chamundas scattered in Prachy valley may come under this group. Mahalaxmi is also eight-armed but is four faced. The Chamunda image in Khiching Museum may appear to illustrate this class of Chamunda (minus four heads). Siddha Chamunda is ten-armed with Javelin, sword, kettledrum and bone in her right hands and shield, belt, mace and trident in the left hands, the remaining two holding two ends of an elephant skin. This approximates a Yogini image at Hirapur. Siddha Yogeswari and Rupa Vidya have twelve arms holding lasso and elephant goad, besides the usual attributes of Siddha Chamunda. Some of the figures are in standing pose while some are sitting. The standing figures according to scholars are taken to be those of Siddha yogeswari and those of sitting ones as Rupa vidyas. Images of these varieties are preserved in Rajasahi and Dacca Museums of Bangaladesh. Ksama has two hands represented as an old woman with lips wide open and surrounded by jackals. No images of the variety have yet been recovered. Dantara is also two armed, squatting on the ground with a hand on her knee. A two-handed Chamunda image now in the Bangya Sahitya Museum represents this variety. Another image of Chamunda hailing from Jajpur in Orissa represents the Dantura aspect of the goddess.

The availability of varieties of Chamunda images in large number in Eastern India points to the conclusion that this cult as a malevolent manifestation of Devi spread widely in the Sakta tantric pithas. The detailed study of this cult individually and in the group of matrikas will throw a flood of light on the sakta tantrism prevalent in mediaeval India with concentration in the eastern part.

Curator, Orissa State Museum,
Bhubaneswar.

◆

MASSIVE HORTICULTURAL PROGRAMME

A massive horticultural programme for raising orange and Narangi has been taken up at Ramagiri in Ganjam district.

Last year 336,000 orange seedlings and 95,000 Kagzi lime seedlings were raised in nursery beds for plantation in different orchards.

Freed from podu cultivation, 321 tribal cultivators living in 15 villages have raised 74,000 orange plants and 7,500 Kazi lime plants. Similarly, nearly 82,000 orange plants and 18,000 Narangi plants have been grown in the fields of 487 tribal cultivators in another 35 villages.

The entire Block Ramagiri-Udayagiri is ideally suited for cultivation of citrus fruits like orange and lemons. The Agro-climatic conditions coupled with higher altitude and right type of soil of the area are condusive for cultivation of these fruits. Skin orange, lime and lemon are found growing wild on the hillslopes in Ramagiri-Mahendragiri hills. Systematic cultivation of Mendarin oranges have been undertaken by the Soura tribals of the area some two centuries ago.

Previously oranges produced in hill slopes were being marketed through traditional middle-men who ruthlessly exploited the poor traibals. Now this is done through the Orange Producing Co-operative Marketing Society set up at Ramagiri and Jirang with a total membership of 502. The Tribal Development Agency, Parlakhemundi has spent Rs. 9·50 lakhs for constructing a road to link Ramagiri with Jirang. On completion of this road, many potential fruit growing pockets will become accessible and the benefit will flow to the tribals inhabiting these areas.

THE FORGOTTEN CITY OF JAUGADO

DR. KRUSHNA CH. JENA

Jaugado (N. Lat. 19·33,E. Long 84·50) in the Ganjam district is one of the most important historical places of India. The Kalinga Edicts of Asoka are found here. It stands as the symbol of the historical heritage connected with the Rusikulya Valley civilization. From the bank of the river Rusikulya coins of different periods are found in large number. Some of the coins belonged to the Pre-Mauryan period. Many coins belonging to the Kushan period have been collected in the vicinity. There is ample ground to claim that the Kushans had extended their territory in this area. For some time it was felt that these coins might have been carried by people from the Kushan kingdoms to this part and this part was not ruled by the Kushans. But from the size of the coins which indicate the rough circumference one can infer that the coins were not much circulated before reaching this place. The mints from which these coins came must have been in the vicinity. Many of these earlier coins resemble the Kushan coins found elsewhere. The impression of the king is on one side. The other side contained the picture of a lady, either a dancer or the queen.

Tradition ascribes that the fort of Jaugado was built by Durjyodhana of the Mahabharata fame. There are five stone images worshipped in the temple of Gupteswar. It is believed that these five images represent the five Pandavas.

The course of the river Rusikulya has been changing for the last several centuries. It could be just possible that the river had ran adjacent to the front in the past. More significant is that fact that coins of different periods were found in large number, indicating the possibility of large scale trade and commerce. The river might have offered a good chance for such inland trade and commerce. The river Rusikulya flows into the Bay of Bengal and at the confluence History had always witessed intense trade activities. It might be one of the reasons that we find silver coins of large number on the beds of Rusikulya and at the site of Jaugado; belonging to the Pre-Mayurayan period. People use to get gold coins also but usually they do not divulge it and keep them for themselves. Many copper plates belonging to different ancient periods of Indian History have also been discovered in the site.

Of relatively recent history is the Kipleswar Sasana founded by the Gajapati Raja of Orissa Kapilendra Dev, Purusottampur was founded by Purusottam Dev, Pratapurudra Dev founded Pratappur and a number of other habita ions carry the memory of History. The town of Aska is said to have been founded by Asoka the Great. It is also believed that this area attained independence on the decline of the Gupta empire and from that time onwards it has been passing through many historical landmarks.

The small but strong and indepedent kingdom of Kongodo was formed out of this tract and its surrounding area. Kongodo had attained one of the highest points in the history of Eastern India and had placed the glory of the region on the apex. The Sailodbhabas ruled here with distinction. The Sailodbhabas who had international trade with the countries of the Indian Ocean might have used the Rusikulya river to reach the sea.

We have found many coins belonging to the European traders including those of the East India Company on the site of Jaugodo. This means that the place was humming with life and activity till recent times, the coming of the European powers to India. Even today, coins of different sizes, pottery of various size and colour, rings of earth, earthern pieces indicating different and interesting shapes are found. Pieces from big earthern jars are found in large number. People who have started cultivating the site say that they know of temples, houses, wells and other interesting objects hidden under the surface ground. On a little digging many valuable historical materials are found.

It is difficult to say about the exact nature and dimension of the enclosure. It seems too large for a fort. It is a long square, the opposite faces being 858 yards by 814 yards respectively. The bank, an earthen one, even now in places is 18 feet high and 148½ feet across at the base, and it has two entrances on each side. Inside these banks are found old tiles and debris of houses and coins. After the monsoons these are found in large quantity.

The usual question is how and when this site was deserted. We have seen in history that the river-valley habitations suffered due to the floods in the river and ultimately leading to the decline and death of the towns. From the geographical placing of the river Rusikulya and that of Jaugodo it is less likely that there could be such a major flood which might have been the sole cause of the decline of Jaugodo. The other reason could be great fire that might have burnt down the place. This seems to be more probable. More often than not, in ancient periods, fire had played a devastating role. The recent excavations of Pataliputra has proved that the town was burnt several times. Layers of ashes are found at different depth.

Jaugodo gives us a melancholy picture of sudden and sad end. The countless small fragments of pottery spread in a wide area and burnt earthen pots indicate that there must have been some sudden tragedy. In case of fire, in summer seasons, the fort could have been easily turned into ashes. In the summer seasons, the Rusikulya remains dry and in case of a possible fire, it must have been impossible to meet the challenge.

To support this theory that Jaugodo was burnt, the local traditions say that the fort was made of lac or, Jau'. Therefore, the name of Lac Fort or, Jaugodo' We do not believe that lac was available in those days in such large quantity so as to make a fort of lac or even the compound wall in lac. There is a local tradition saying that the compound wall of the fort was made of lac, an enemy attacked the fort for a long time, and ultimately he could know the secret of the walls and set fire to it. We cannot say if small amount of lac could have been used in Jaugodo or not. But, that the whole fort was of lac is improbable. Had lac been of such extensive use, then there should have been other places in this region making use of lac on such scale. In Orissa, in no other place this has been cited out, less so in the Asokan important places.

We can come to the conclusion that Jaugodo was burnt either by the fires set by an enemy or in the natural course. It could be possible, as in case of Pataliputra, that the place might have risen for a number of times and died as well. It will be proved only when intensive. exacavations are carried out.

Jaugodo occupies an important place in Asokan Studies. Here, on a clean surface of granite rock, there are Asokan inscriptions. More important is the fact th at there are two separate Kalinga edicts. Thvse Kalinga Edicts are found only at Dhauli and Jaugodo. They are believed to have been addressed to the Governors of Somopa. Many believe that the valley between the Mahanadi and theRusikulya could have been the area of Somopa On the otherhand, there are some schotars on

Asokan studies who claim that Somopa was the present area of Somopeta in Andhra, only a very few miles from Jaugodo. Asokan inscriptions in Jaugado might indicate that a triangular area between Somopeta, Dhauli and Jaugodo might have been under one administrartive control.

About the daring of the inscriptions at Jaugodo, there is difference of opinion. According to one school of thought the separate Kalinga Edicts were added later to the main Asokan edicts. The Asokan edicts were general instructions and it might be possible that the separate Kalinga Edicts were added for special information for the good administration of Somopa.

There is growing belief that the Kalinga edicts were prior to the general edicts. Both at Dhauli and Jaugodo the placing of the Kalinga Edicts is interesting. The inscriptions on the Dhauli Rock appear in three columns, Rock Edicts I to VI in the middle, Rock Edicts VII to X and XIV on the right hand side and the Kalinga Edicts occupying the whole of the left column.

The Edicts at Jaugodo bear a line of demarcation between the general edicts and the Kalinga edicts. The two separate Kalinga edicts are enclosed as if with special care by lines. Morever, the upper portion of the Kalinga edicts is marked by a Swastika symbol which figures at the two corners, while the lower portion is figured four times by letter 'ma'. It is believed that the Swastika may be taken as the monogram made of two Brahmi letters 'O' and 'ma', the final letter indicating the sacred symbol of 'OM'.

The separate Kalinga Edicts at Jaugodo give us more information about the detailed adminisnistrative measures of the Emperor. It can be inferred that in the administrative divisions there were governors—sometimes under the jurisdiction and command of the Kumar-Viceroy and sometimes under the Emperor himself. In the Province of Kalinga with its Viceroy at Tosali, there were some smaller divisions. Possibly Jaugodo was one of the them and could be the more important one. Jaugodo or Somopa was under the charge of a class of Mahamatras who were entitled to receive the Emperor's message directly and not through the Kumar Viceroy. The Kumar Viceroy could be one of the brothers of Asoka, By the time the separate Kalinga esicts were engraved this was the position. Might be at a later time, either another brother of Asoka, or one of his sons or one of the reliable officers might have taken the charge of Somopa.

The idea that Asoka had placed one of his brothers at Somopa would lead us to the controversy whether Asoka had killed all his hundred brothers as mentioned in the Buddhist literature or not. There are some information in which we find that Asoka killed only six of his brothers. If we believe the Dipavansa and the Mahavansa in which it is stated that Bindlesara had sixteen wives and one hundred and one sons then there is sufficient ground to agree that Asoka had many brothers to help him in his administration. . . No wonder, one of them could have come to Somopa.

The history of Jaugodo does not end with the Asokan empire. It has had a longer history. Authorities have placed the rock edicts here at 246 B. C. Definitely, Jaugodo has not been sleeping and silent since then. There must been layers of civilization thickening time after time. The historical materials scattered as they, could not belong to the Asokan period alone.

Just to cite out an example, a few years back near the Kesarapali village on the foot of Malati hills an old fort has been discovered. This fort has the marks of wide walls. Near this, a temple has been discovered and there was a beautiful image of the size of a man This is now worshipped an Bisnu at Buguda not very far off from Jaugodo. This might mean that surrounding Jaugodo there grew a floursing centere of life, religion and activity.

Attention can be drawn to the temple of Taratareni situated on the top of a hill. It can be presumed that this Sakti Pitha was originally a place for the Tantric Buddhist. In the Buddist iconograpy Tara is also known as Tareni. They are not separate. But, this was not understood by the later Hindus and they imagined that Tara and Tareni are separate and are sisters. In Orissa, in no other place the Tara and Tareni are worshipped. On the otherhand, the Buddihist

Tantries have popularised Taratareni as important. It is probable that with Jaugodo as a Buddhist habitation, Taratareni grew as their centre of religion.

To support the importance of Jaugodo, there grew at the mouth of Rusikulya a port that of Palur which means in South Indian language; a Town of Tooth or Dantapura. This was the place from which the sacred tooth of the Buddha had been sent to Ceylon. Palur stood the test of time for a very long time. Even after the downfall of the Buddhist period in this part of the country, Palur served as the means of communication between Orissa and the rest of the South-Eastern countries of the Bay of Bengal. It might have supported as the port for the Rusikulya civilization with its headquarter at Jaugodo.

The findings at Buguda which indicate that there was a important historical development further helps the theory that Jaugodo was a centre with which revolved a large area of this part of Kalinga Empire. In certain parts, it has been doubted that the great Buddhist scholar Dhramakirti had either his school or his disciples had built some memorials for this great Guru and Scholar. This leads to the idea that scholastically the area of Jaugodo was reigning high.

More important is the fact that recent researches indicate that the Kalinga Empire extended only to the present Ganjam portion of Orissa. The Kalinga Empire mainly consisted of the present Andhra area. If this be true, then Jaugodo would become one of the last pillars of the Kalinga Empire and as such would attain greater historical momentum.

It is important that to find out the real historical importance of this forgotten town of Jaugodo there should be more and intensive study and research. This will open new dimensions in the history of the Eastern part of the country,

REFERENCE AND HELP MATERIAL

1. An Early History of Orissa—Mittal
2. Ganjam District Manual—Maltby
3. Buddhism in Orissa—Dr. N. K. Sahu
4. Buddist Iconography—Bondopadhaya
5. History of Orissa—I, Dr. H. K. Mahatab
6. Asoka—Smith
7. Jaugado—K. Das
8. Utkal Itihasa—K. S. Misra
9. The History and Literature uf Buddhism—Rhys Davis—
10. Insriptions of Orissa.

Berhampur University,
Bhanja Vihar Berhampur

●

Rs. 44·50 LAKH CENTRAL AID FOR MARKET DEVELOPMET PROJECTS

By the end of 1978-79, an amount of Rs. 44·50 lakh has been received as Central assistance for Market Development Projects in the State.

In order to ensure payment of reasonable price to the cultivators for their agricultural produce, 10 regulated markets and 24 primary Markets will be set up in different parts of the State. The Market Development Projects will be implemented with the Central assistance along with loan component to be released by the State Bank of India.

The ten regulated markets at Junagarh, Nowrangpur, Khariar Road, Gunupur, Sakhigopal, Padmapur, Koraput, Jeypore, Bhadrak and Kantabanjhi have been allotted with Rs. 20·50 lakh and the 24 primary markets allotted with Rs. 24 lakh @ Rs. 1 lakh each out of Central assistance.

Democracy in Education through the Ages

SHRI JAGANNATH MOHANTY

The general impression is that Democracy is an accidental product having its origin in Greece during the 15th Century B. C. when the various City States like Athens, Sparta, Miletus and Ephesus experimented with different forms of Government and finally adopted democracy. But the concept of democracy was not only originated in India before the growth of the City States in Greece, but also greatly influenced the social, political, religious and educational activities of the Aryans even between 1500 to 2000 B. C.

The "love of all mankind" central to Hindu Philosophy as well as to the values of Indian life and which has been expressed in many noble sayings like "Basudheib Kutumbakam", "Sarbe Bhabantu Sukhinah" and so on is also the basis of democracy. On the other hand in the West the noble phase "brotherhood of man" has remained largely verbal sentiment, because it has had so little chance of implementation. It may be that national and international democracy has ushered in the first moment of history when this principle has a chance (1).

It is however, to be agreed that in the West particularly in England and France the stream of democracy has been flowing continuously with new life and vigour through struggles and revolutions, whereas in the East specially in India due to foreign invasions and inertia, apathy and orthodoxy, it has largely dried and partly lost its course amid blind rituals, superstitions and alien administration.

There are some Indians who maintain that democracy is consistent with India's traditions and therefore does not need emphasis. Most of Indian historians neatly puncture this doubtful theory, pointing out that Vedic society is not like modern Indian society, that the ancient Village Panchayats do not resemble the Loka Sabha. India has long understood and used the principle of consensus, but concensus in a relatively small, homogeneous group of relatives and neighbours is quite a different matter from consensus in a large and hetergeneous society. "Authority" in the former situation was centralised, hereditary and respected; in the latter it is dispersed and delegated. "Government by consent of the governed" is not the same as ,,Government by participation". (2) As such to these critics Aryan Democracy was not democracy at all'.

If this is so, then the Athenian Democracy even cannot be called a democracy. Because it was also limited to a small City State and a large number of Athenians were also deprived of citizenship. Slavery was even eulogized by them and did not hamper the growth and fuctioning of democratic institutions. Like Greek City States, in India there were many Janapadas or clans which had democratic ways of living and administration based on the principles of self-government. Often they had "samities" or assemblies which were attended by the people from different strata of the society for discussing the affairs of the State and taking decisions. There were both republican as well as monarchical rules, most of them being limited by "popular will".

In the Vedic India democratic spirit pervades the methods of teaching, learning and school organisation. Debates and discussions were important pedagogic methods. Goutam, the Vedic saint in his "Nyaya Sastra" has mentioned that knowledge derived from observation, inference, comparison and testimony should objectively be verified by discussion which usually leads to the enquiry of truth. In the Ashrams or residential schools pupils hailing from royal and poor families used to be taught equally under the same roof without caring for their payment of more or less tuition fees and gifts. Of course, the lower class or Sudra children like slave children in Greece were deprived from formal learning and education. Thus excepting a few such blemishes, Vedic educatioanal system and methods were democratic.

In the Greek City States on the otherhand there was democracy, but the democratic tendency could not pervade the educational system so deeply and widely. Even Athens and Sparta had not a democratic education since the slave class in both the city states was the largest element in the population to whom formal education was denied. Moreover, education in Athens was open to boys only and not for girls. Trade and useful manual works were regarded as undignified to the citizens and were often left to slaves. Thus, with Greeks originated the present day division between white-collar jobs and manual works. (3)

In comparison with Sparta, Athens had more democratic education with more educational provisions for non-citizens. According to Butts "foreigners in Athens could attend the cynosarges, foreign Sophists were welcomed as teachers, foreigners were welcomed as students and in Hellenistic times foreigners were admitted to Ephebic colleges". (4) In Sparta on the otherhand, foreigners were never eligible for the educational facilities available to the citigenrv. But Sparta treated its students more equally than did Athens, more attention was given to the education of girls and the State went further in proivding free education to citizenship class. (5) Greek education was definitely undemocratic if it is measured by the extent to which it served a whole population. Nevertheless, the Greek heritage paved the way for later developments in democratic education.

Democratic Education in Rome

In Rome also education was not so much democratic,. Butts has said " Just as Roman civilization was largely aristocratic in character, so was Roman education confined in a large measure to the privileged and wealthy classes". (6) Despite the steady democratizat on in the 4th and 3rd centuries B. C., the political control of Rome was never as democratic as in Athens. The trend towards democratization was soon terminatted during the 2nd Century B. C. and the aristocratic classes continued to be the dominant political power in Rome. Consequently education was virtually limited to the aristocratic senatorial and Knightly classes. Even subsequently when church began to take over control of much of Roman education, it did little to change the essentially aristocratic character of education.

Democracy in Buddsist education

On the contrary, in India during the Buddhist period, i. e., especially from 5th century B. C. to 1st century B. C. a number of domocratic principles were applied not only in the religious field but also in the educational system through councils or ,sanghas'. The Buddhist system of education like the Vedic Education laid equal stress on the method of debate and discussion which was democratic in nature. According to Dr. R. K. Mookerji democracy was more evident in the learning process and the schooling system. In the Buddhist education centres there were also no distinctions of caste, class or economic disparity. Even the poor students supported by charity were rubbing their shoulders with the sons of Kings and nobles. Moreover, all pupils had to follow certain standard of simplicity and discipline in living and learning. This had a great "democratising influence" on life and education. Similarly, the democratic control and administration of the Buddhist monasteries were evident from the reports of I-Tsing and Hien Tsang (7).

Reference—

(1) Cormack, Margreat, *She who Rides a Peacock*. p.-218.

(2) Ibid. p.-219

(3) Jarman, T. L.—Landmarks in the History of Education. p.-12.

(4) Butts, R. F.—Cultural History of Western Education. p.-13.

(5) Ibid. p. 41

(6) Ibid. p. 92

(7) Mookerji R. K.—Ancient Indian Education. p.-483.

Officer-in-Charge,
Educational Technology Cell,
Directorate of Public Instruction, Orissa
Plot No. 36 (A), Unit-III, Kharvela Nagar,
Bhubaneswar.

●

MINING REVENUE UP

Orissa, a leading producer of minerals in the country, collected mineral revenue and cost totalling Rs. 754·34 lakhs during the year 1978-79 as against the target of Rs. 550 lakhs.

The State's Directorate of Mines carried out systematic exploitation and assessment of mineral resources besides promotion of mineral based industries and development of infrastructural facilities for augmenting revenue from minerals. The mineral inventory and reconnaisance survey was carried out over 761·93 Sq. Kms. besides detailed mapping 103·51 Sq. Kms. Such exploration brought to light several important mineral occurrences like graphite, galona, beryl, mica, China clay, fire clay buxite, gold and tin.

Project scale exploitation of buxite in Koraput and Balangir districts in collaboration of Geological Survey of India and the Mineral Exploitation Corporation of India proved a reserve of 494 million tonnes of buxite.

During the current year the State Government propose to take up mineral inventory and reconnaisance survey of 2,970 Sq. Kms. out of which detailed mapping will be done over 72·5 Sq. Kms.

FROM LAND TO WATER

Slogan of the mass for immediate Solution to food problem

* * *

FISHING IS UNDERTAKEN IN RIVERS, LAKES, M. I. PS. AND RESERVOIRS NO DOUBT

But

Raise the fish production and remove the deficiency of the Protein by taking up 'Composite fish culture' in tank and Brackish water fisheries with prawn culture in tidal areas.

Institutional finance is all along with Government subsidy.

Come forward to make the campaign

'FROM LAND TO WATER' all success.

CONTACT—

DIRECTOR OF FISHERIES, ORISSA
CUTTACK—753007

'UTTARAYAN' and Baikunthanath Pattanayak

SHRI NARENDRANATH MISHRA

In 1928 thus wrote Shri Annanda Sankar Ray, himself an undergraduate student in the University College of Patna, to Shri Biswanath Kar, the famous editor of the 'Utkal Sahitya' introducing Baikunthanath "my friend Baikunthanath Pattanayak, self-dependent, a votary of independence, a man of indomitable courage and a true poet whom you do not know; because he shums all publicity and does not publish what he writes. His poem will usher in a new era in the domain of Oriya Poetry. A sympathetic critic like you would surely discern how novel and faultless is his rhyme. He never writes verse like others. He writes genuine Poetry. He is a little eccentric and very much imaginative. I believe, one day he will be the greatest lyricist of Orissa." These words, no doubt, came true. Among the group of 'Sabuja' writers the poet in Baikunthanath lived beyond the Sabuja age, which came to an end almost in early thirties.

Baikunthanath was born in October 14, 1904 in a highly cultured family attached to the court of the ex-state, Badamba, where the poet spent his ripe days in a serene atmosphee in a rural setting, with his kith and kin. His father Narayan Sumanta Pattanayak was a poet serving in the court of the Prince of Badamba. But unable to mend the despotic ruler, he had to live as an exile leaving behind the lucrative emolument and his rich estate. So, Baikunthanath who was born with a silver spoon had to taste the penury of life From childhood he acquired revolutionary spirit. At last the restless mind of the displaced and the spirited boy found solace and rest being at home as a pupil of the famous National School at Satyabadi Ban Vihar, founded by late Utkalmani Gopababandhu Das.

In 1920 he joined Ravenshaw College,. He, along with Annada Sankar Ray and some other friends, founded the 'Nonsense Club', which ultimately led to the formation of Sabuja Sahitya Samiti. Baikunthanath contributed the largest number of pomes to the common anthology of the Sabuja group namely "Sabuja Kavita" published in 1931. Utkal Sahitya gave prominent place to the poems of Baikunthanath, because he made bold experiment both in rhyme and theme to break the monolony of tradition in the field of Oriya poetry. During his youthful days the poet was keen to leave also the trodden path of life and became a revolutionary. However, being under close supervision of his elders and beloved teachers, he was not able to leave college and atlast graduated in 1926.

" Better a plough man at one's feet
Than a service man at one's knees":

was his life's motto which he got from the bitter experiences of his father at the court of prince of Badamba. So, instead of hankering after any lucrative job, he liked to serve the society as an honest and humble teacher. He studied privately and got the teacher's training. He also got M. A. degree in Oriya literature from the University of Calcutta in 1931, appearing as a private candidate. He served altogether for a period of 32 years in the Education Department of the Bihar, Orissa and under Orissa Government as a teacher in high school, Headmaster, Inspector of schools and as a Lecturer in the College.

In life the poet had to face many a gruelling situation and dark partings. He lost his 1st son in early youth, which induced him to write his famous lyric sequence "Mrutika Darsan"—gazing the ground. The poet recounts—"I got bitter experience about death from childhood. I lost all zest for wordly pleasure. I tried to look everything above self in the spirit of Vaisnavite philosophy. When the social injustice and political vendetta oppressed my mind, I turned towards the ideals of Buddhism for solace. When I have retired, the fate has denied me health. One light may be out, but at His command hundreds of lights will be lit. So neither I rest in content, nor crave for fame, beating my own drum.".

The poetic word of Baikunthanath is not very wide, but it is an intimate one created by an ever searching mind. As we have noted, poems of his early youth appeared in common anthology of the Sabuja group in 'Sabuja Kavita'. But later on Baikunthanath experimented with play writing. But they are not large in number. Their spirit is poetical. Muktipatha (1933) is a lyrical drama which not only idealised love, but also depicted human sufferings with rare vision. Prof. Girija Sankar Ray aptly remarked in Odia Natyakala, "this one drama will live for ever for its fine literary achievements among hundreds of dramas written merely for stage." In 1943 the poet took much pain to collect and compile his numerous lyrics in Kavya Sanchayan". The poet observed, it is easy to make garlands with fresh plucked flowers, but it is difficult to make one collecting petals strewn in dust."

Baikunthanath was honoured by Bharatiya Sahitya Akademi for collection of his poems titled "Uttarayan", where the golden hue of a horizontal luminary shines with ever fresh glow. Uttarayan is really a single poem, a composite work of art though it has taken the form of hundreds of short lyrics, some odes, some sonnets and most of them are lyrical reflective songs. The unity of this work springs from the depth of one extended soul exasperated by the excision of modern man in an uprooted society.

In a symbolic way Uttarayan depicts, what has been painted on the cover : the eternal circle of life, two pairs of flying swans, a tree facing storm and a simple rustic woman resting her left hand on pitcher the eternal spring of life and smelling one fresh plucked flower in the right hand on the tapestry of grey and green. The anthology is dedicated to the friends of the Sabuja group. The person of the poet is sitting like the mute Buddha in a portrait done by the famous artist late G. Kanungo. In a short preface the poet gives an account of the memory of the friends of the Sabuja age and recounts the transformations made in the minds and souls of the eternal greens—great minds of the past and the humble hearts of the new borns, the young elite and the laity alike. Otherwise the insipid preface is followed by a touching insinuatory song. The bright morning sun, the humming bees, the countless blooming flowers steal the despair and the stains of those who seek to evolve a philosophy of life. The maiden of love plucks flowers, but fails to pluck one and all. The hot sun makes the flowers dry and fall and the poet gives the price shedding his tears for these dying beauties. The poet is not for his own self, he is for all. His pleasure, his pain his ongs he shares with all and all with a full heart. There is no question of escape. Then it is the problem of having a deeper communion with every thing, that rots on the earth, in the process of giving away, burning out to sustain life. So the poet sings, sings with his eyes fixed on good old sullen Earth :—

The song of earth makes me quiver
No sweeter music have heard I ever
All the wants of life here fulfilled
Nothing beautiful man can build.*

The poet worships man who descends on earth to mend as mentor the work of God. They are the saints born out of empathy with the suffering lot. Great souls adore this earth to wash away the dust and filth accumulated by the greed of man of power and wealth. The natural lust for possession makes us seekers of self. The atmosphere gets poisoned. It is only the great, who annihilate self, shower bliss. It is only the poet in Baikunthanath which so intimately communicates with the prophets of the past and the visionary of the present. Buddha, Christ, Gandhi, Vinova and many others have come to the focus of the poet's sensitive vision. This section namely 'Santh Pranam'—'salutes the Saints', aims at rejuvination of modern man, the sick, the sinners being imbued with the spirit of the great.

Then there is another section "Sabuja Swapna"—'the dream of the green', Miles and miles of green open fields, countless ripples of ever flowing streams, the unheard music of the hidden brooks in the lap of green forests, the splitting and ever sprouting clouds above the brown hillocks below the canopy of the clear blue sky all come to sooth and solace our heart. The endless spirit of youth washes and lashes the old and worn out habit of short sighted man. With the picture of the living nature lively similies, images easily come to the poets' mind. The black cloud spreads like plait of a joyous maiden. Like a fading silver line, the flying swans in the horizon beyond the dark forest shower a moment's joy that sustains the life's long march through unknown woods. When thus the poets' soul has a communion with Nature one feels the joy of happy return to the primodial past, when man was primitive but his heart was pure and his mind was fresh, free of lust.

From this nostalgic green dreams the poet awakes to be one with the world around him. Here we find his concern for fellow man, his heart bleeding for the fate of the oppressed and depressed individuals in a merciless society and disintegrating homes. He often reminds us that we are in the same boat. Either we are to repair it or to face the ultimate disaster together. We all face the splitting moments, the gushing stream of time's uninterrupted flow. There is a force beyond our cognizance which makes us clash and compromise, which makes us melt and move. The poems of the section 'Ksanika' reveals the split moments of our inner mind. Dreams come and vanish. Desires rise and die. That happens to empires in history, what happens to rocks in geological times, that great drama is also being enacted every moment in our mind. The great hunger of the demon 'Kalnemi', the melting of countless burning sun, and the showering of the cloud of deluge—all are but movements that made this little earth our beloved mother. In her lap we are tiny creatures. There descends a cosmic vision that gives meaning and life to what we see and feel every moment. The poet, the creator, not only creates the world, but also gives soul and strength to fight death and shun despair.

Oh moments lamp ! burn oh burn
Fruitless pleasures bring pain in turn

Till there is oil, there is the flicker
May the silent song of life's joy linger*

A true poet speaks a language of his own. He does not discard totally the language of the common folk. The poems in the section called 'Ganvani', reveals keen social awareness of the poet. Those who play the chess of life, can move in space, at the same time, remove the tears from the eyes that weep. To seek and find, to discover the ultimate truth and to invent the instrument for never failing happiness is the goal of man. In the path of knowledge there stands a mountain of ignorance, a desert of prejudice. Our progress in this difficult sojourn of life may not be smooth, may not be as fast as we desire, but in the words of our poet :

> It's our fate to walk till death and search
> Like a silent hillock's motionless march.*

A poem if at all a creation, it is a creation in language. The sound and sight, the sensual perception and a sensual conception everything flows from the fountain of the fluid flush of the structure of the poets inner mind which reveals itself in the language of his heart. A poet may arouse much curiosity taking the help of inflated rhetoric, and jargons with an expressed motive of giving a true picture to psychic turmoil of modern man. But Baikunthanath's poetic world created during the span of more than half a century transcends itself beyond the stigma of socalled modernity or out modded antiquity. Uttarayan stands for the centre, the resting abode of the 'Polestar' that shines for eternity. He is a poet, contemporary and yet lives beyond the frontier of our known past or unknown future. Though written in the language of a little community that occupies a small part of our vast country, "Bharat Mata", the inner voice is meant to be heard by the humanity at large. Where volumes could be spoken, and het with an appalling sense of defeatism let us confine to our limitations again in our poets' own words ;

> The path is far, shadowed by the setting sun
> Yet the empty cup is filled, life is a well wrought urn.*

Reference

*Sabuja Akshara—Annada Sankar Ray—P. 254-255

Das Brothers, Cuttack, 1964.

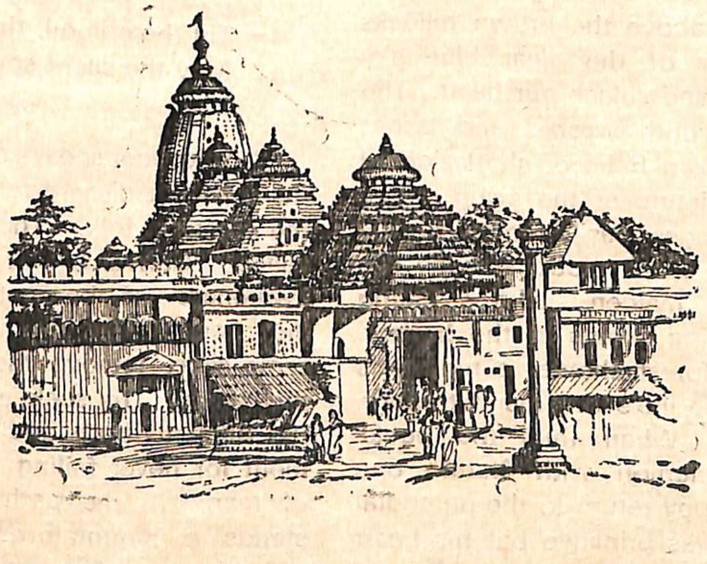
*Baikunthanath Granthavali—Vol. I. Edtd. Dr. K. B. Das, Int. P. 13, Utkal Sahitya Samaja, Cuttack. 1976.

libd, P. 58-59.

*Uttarayan—Baikunthanath Pattanayak, P. 264, Das Brothers, Cuttack, 1964.

**libd*, P. 273. * *libd*, p. 265, * *libd*. 264

Reader in Oriya
Viswa Bharati,
BOLPUR—731235
West Bengal



Achievements in Animal Husbandry Sector in Orissa

⁂

Dr. BANSHIDHAR JETHI

Much emphasis has been given to improve the economic condition of the underprivileged mass of Orissa, who constitute major portion of the population, through introduction of improved Animal Husbandry Practices and Cross Breeding Programmes. The overall achievements in Animal Husbandry Sector are as follows :

Cattle Development

During these years, 4 Intensive Cattle Development Projects with 275 units, 26 Key Village Blocks with 246 Sub-Centres, 469 A. I. Sub-Centres, 946 Natural Breeding Bull Centres and one Hill Cattle Development Project with 22 units are in operation in the State. At these Centres, A. I. work has been taken up with exotic and Cross Bull semen. For this purpose 26 numbers. of collection centres have been established where there are 131 Exotic Bulls and more numbers of Crossa-Breed Bulls. One Frozen Semen Bank at Cuttack has been opened and Frozen Semen is being produced there. Four centres have been opened in the drought prone districts of Phulbani and Kalahandi in collaboration with the Bharatiya Agro Industries Corporation for development of cattle through exotic breeding by using Frozen Semen technology. 10,000 cows belonging to 5,000 small and marginal farmers including agricultural labourers will be benefited. Till now the coverage through A. I. is 33 per cent of the total cow population and through natural breeding it is 9 per cent of the same.

The Exotic Cattle Breeding Farm at Chiplima with DANIDA assistance has been established and cross breeding has been taken up in 12 Cattle Breeding Farms of the State. One Jersey Cattle Breeding Farm at Similiguda and one Red Sindhi Cattle Breeding Farm at Chiplima are also functioning in the State and these two farms have been established by the Government of India.

For fodder productionin in the State, Minikit programmes, Pasture Development Programmes and Fodder Tree Plantation Programme have been introduced. Three Fodder Farms have been established at Panchamahal, Chiplima and Salapada to provide fodder seeds to farmers. Besides, Para grass cultivation on low-lying road side burrow pits have also been extensively taken up.

For collecting, processing and marketing of milk, 300 Primary Dairy Co-operative Societies have been organised and District Milk Producers Unions affiliating the Primary Milk Producers Societies have also been formed. Financial assistance is being provided to farmers through S. F. D. A., M. F. A. L./L. T. D. P./T. D. A./D. P. A. P.-Agencies to purchase milch cows. So far thousands of farmers have been benefited through these programmes. Operation flood phase II is contemplated to be implmented soon.

Special Livestock Production Programme

A centrally sponsored scheme "Special Live-stock Production Programme" is being implemented in the State for the benefit of small/marginal farmers and agricultural labourers, since 1976-77 under which the following programmes are in operation :—

(*i*) Calf Rearing schemes in Cuttack, Puri, Sambalpur and Dhenkanal districts:—Cross breed female calves between the ages of 2 and 28 months are being subsidised for supply of premixed feeds.

(*ii*) Poultry Development Programme in Cuttack, Puri and Sambalpur districts have been taken up for establishment of 50 layers' units and marketing of eggs is being done by the Egg Marketing Federation.

(*iii*) Piggery Development Programme in Koraput and Keonjhar districts are in operation as these two districts are intensely Adivasi populated districts.

(*iv*) Sheep Development in Puri and Balangir districts during this year has been taken up.

Poultry Development

Intensive Poultry Development Projects have been established at Rourkela, Bhubaneswar and Berhampur. Under these projects, 1,017 units are functioning at present.

These State Poultry Farms located at Sundargarh, Angul and Koraput and one Government of India Poultry Farm at Bhubaneswar have been taken up to produce genetically superior stock of birds for supply to special projects and other farms in and outside the State.

The Feed Mixing Centres at Sundargarh, Remuna, Angul, Bhanjanagar and Koraput are supplying balance premixed feeds to all farms and projects including cattle, sheep, goats and pigs.

200 numbers of Poultry Co-operative Societies have been organised in the State. Some of these units are federated into a State Level Poultry Producers' Co-operative and Egg Marketing Federation for marketing of Poultry and Poultry Products.

A Carcass Utilisation Centre in the co-operative sector has also been organised at Cuttack.

Poultry units have been established in 27 Blocks under the A. N. P. Fifteen more A. N. P. Blocks have been selected to start with 600 back yard poultry units and 500 Duck units through UNICEF assistance.

Duckery Development

There is enough scope for duck development in the State. Ganetically superior ducklings have been imported from England. Multiplication of these ducks is being done. The cross breeds are being supplied to waterlogging areas for production of eggs and meat and these ducks will act as biological control for liver fluke diseases in exotic cattle mostly in the I. O. D. P. areas. Custom hatching facilities have been provided to the farmers.

Disease Control

The Orissa Biological Product Institute has been strengthened to increase its production capacity of various vaccines and to produce the new tissue culture vaccine against rinderpest. The typing of various strains of virus responsible for outbreak of foot and mouth disease so very rampant in the State has been undertaken through the Epidemiological units established by the Department in the Veterinary College Premises at Bhubaneswar. Simultaneously, vaccination of cross-breed animals with F. M. D. vaccine has been taken up and 50 per cent subsidy towards cost of vaccine is being borne by the Department.

Director of Animal Husbandry &
Veterinary Services, Orissa,
Cuttack.

SUN TEMPLE AT KONARK

DR. A. JOSHI

Konark is situated at a distance of 66 Kms. from Bhubaneswar, the Capital of Orissa. The meaning of Konark is the Corner Sun (Kona-Arka). It is known from the copper-plate inscription that Narasinghdeva-I (A. D. 1238—64) constructed the great palace of Sun God in the corner of Trikona (Trikona-kone-Kutirakam— achikarad—Ushnarasmeh). Langula Narasinghdev is stated to have built this magnificient structure dedicated to Sun God due to genuine regard for this great killer of diseases and source of life on earth. Narasinghdev is stated to have been cured of a vile disease and in memory he erected the abode of Sun God. Narasinghdev was so grateful to the God Surya that he named his son as Bhanudeva.

History of the Temple

Konark is also considered as a memorial of the emperor's successful conquest against Mahamadans. This monument was considered as a wonderful architecture is known from Abul-Fadl's accounts in the A' in-i-Akabari. Abul-Fadl has stated that twelve years revenue of Orissa was spent for construction of this temple. Even those whose judgement is critical and who are difficult to please stand astonished at its sight. He further stated that over 730 years ago Narasinghdev completed this stupendous fabric and left this mighty memorial to posterity. Twenty-eight temples stand nearby; six in front of the entrance and twenty-two elsewhere.

Madalapanji (the Jagannath temple chronicle) informs that Maharaja Narasinghdeva son of Maharaja Purusottamadeva of the Bhoi dynasty of Khurda visited Konark temple in 1628 A. D., when Bakhar Khan was ruling over Orissa at the time of Jahangir. It further says that the image of Sun God was removed to the Jagannath temple at Puri due to invasion of Bakhar Khan. The Muslim invador damaged the Kalasa and the lotus-finial after which this massive edifice was abandoned in 1628 A. D. In course of time the whole structure was covered with vegitation and due to utter negligence huge trees must have taken roots. These trees must have caused decay to the Khapuri, Amla and the corbelled walls which fell down due to storm or lightning or earthquake. In A. D. 1825 A. Stirling visited Konark who says that the temple still remains standing to the height of 120 feet in ruins and the broken temple was resembling that of a ship under sail. In A. D. 1837 James Fergusson visited Konark and prepared a drawing and calculated the height of the broken sanotum to about 150 ft. Kittoe visited Konark in A. D. 1838 who says that the broken temple stands to the height of 100 feet and appeared like a column. This corbelled roof of the ruined temple dropped due to strong cyclone in October, 1848. In 1868 Rajendralala Mitra saw the reduced temple as an enormous mass of stones studded with a few pipal trees here and there. The visitors and the people in general removed the beautiful pannels of stones, iron cramps and dowels for centuries. The Raja of Khurda removed a good number of beautiful carved chlorite images, as is known from Kittee's description. The Nava-graha slab, which was seen by Stirling in 1825 in position, fell down some time before 1838. The Marine Board of the East India Company suggested in 1806 to take up conservation of the Black Pagoda to the Governor General who only ordered prevention of removal of stones from Konark. In 1859 the Asiatic Society of Bengal made an attempt to shift the Nava-graha slab to the Indian Museum at Calcutta. But the heavy stones could not be carried even to a short distance and the sea remained at a distance of 3 Kms. The first atempt of shifting the Nava-graha slab to Calcutta by sea was abandoned. In 1881, the Lieutenant-Governor of Bengal, Sir Ashley Eden visited Konark and ordered for clearance of vegitations and mounting of the pairs of the huge elephants, horses, lions on elephants on masonry platforms. In 1892, the Lieutenant-Governor Sir Charles A. Elliot visited the temple and ordered for conservation. A second attempt was made for shifting of the Nava-graha slab to Calcutta which was longitudinally cut into two parts. The carved portion of the Nava-graha along with thirteen beautiful sculptures were proposed to be shifted to the Indian Museum at Calcutta; but the local people objected and therefore, only thirteen sculptures were shifted to Indian museum in 1894. Since then the temple was maintained by the P. W. D. and the Collector arranged police patrol. Sir John Weodburn, the Lieutenant-Governor of Bengal visited Konark in December, 1900 A. D. and realised the urgency and the compelling circumstances of protecting the grandeur of the monument. The sand and stone debris were cleared up and the three gate ways were brought to light along with the wheels and a good number of remains of temples and the compound wall, the interior of the jagamohan was extremely unsafe and stones were falling from the ceiling. In order to support the dangerous over hanging stones of the ceiling, the interior was filled with sand after 4½ metre thick lining of dry masonry was constructed along the interior walls. Sand was filled to the top through the hole on the roof of the Jagamohan and repair to the exterior part of the temple was taken up. The southern door was badly damaged due to the fall of the sanctum and therefore it was permanently sealed up. This work of conservation and removal of debris and plantation of casuarina continued for a period of 10 years and the monument was brouht to a stable position at about a cost of rupees one lakh. Small repairs like chemical treatment, paper pulp and fungicidal treatment are being made regularly. In 1950 an expert Committee on Archaeological conservation on Konark temple was formed who met from time to time and recommended measures of conservation. During 1957-58 attempts were made to examine the foundation by digging on the south-east corner and it was found that the plinth underground are made out of laterite stones. Therefore it was felt necessary to strengthen the plinth and holes were driled into the core of the masonry foundation for filling up liquid cement mortar under 40 lbs. of air pressure per square inch. Besides, solidifying the plinth, structural repairs and chemical treatments, beautification programme has been undertaken.

In spite of measures taken for conservation of this magnificient monumnent the lowest projection of the Jagamohan on the north west corner sheared off on the 1st of August, 1978 which caused panic amongst the tourists and visitors of the world.

Architecture

The Sun temple at Konark is the work of the matured sculptors and architects who possessed several centuies of temple building experiences. In fact, the Surya temple marks the pinacle of the Kalinga School of Architecture. The Sun temple has been designed in the form of a chariot as if drawn with twenty four wheels seven spirited horses. The original sanctum and the Jagamohan were raised on a high platform. The Arun pillar now in front of Jagannath temple at Puri was previously installed in front of the Jagamohan of the Sun temple at Konark. The Nata Mandap has been constructed towards the east of the temple, which appears to be a part of the original project.

The sanctum had a curvilinear tower known as a Rekha type of temple. It was Panch-Rath in plan and originally attained the height of 225. The Orissan temples are mainly divided into several parts namely, Pishta (platform) (vertical wall), Gandi (trunk) and Mastak, crowning elements) etc. The Bada is again divided into Pabhaga, Tala Jangha, Bandhana, Varanda, Upar Jangha etc. The Gandi and Mastak is again subdivided and follows the anatomical names of human form; such as the neck, Khapuri etc. and the crowning elements which are constructed over the roof of the structure. The Jagamohan (anti-chamber) where the people gather for worship is generally a Pidha type of temple. The roof is made out of the stopped pyramids in three tyres. The Jagamohan of Konark temple is also a Pidha type of temple which is again divided as Bada, Gandi and Mastak. The Bada is subdivided into Pabhag, Talajangha, Bandhan, Uparjangha, Baranda. The Gandi is divided into Potala Kanti and Potala. The Potala's are separated by a small vertical well known as Kanti. On the top of this Gandi is the Beki or neck which is again super-imposed by Ghanta, Amalbeki, Amala, Khapuri, Kalasa and Dhwaja. The anti-chamber of Konark is now preserved up to the top of Amala. The sanctum is now in ruins, but it has a square cell. The spiral structure as well as the piramidal structure rested on corbels reinforced by huge iron beams

The foundation has been constructed out of laterite stones which are super-imposed with poorer quality of sand stones. The whole structure has been made out of sand stones which have easily weathered and is the main cause of decay of the monument. These huge stones collected from different distances were transported through the river Chandrabhaga, elephants, bullocks and man-power. The huge stones were dragged with elephant forces and human labour on sand piled up to the working level of the temple. The stones have been dressed in such a manner that the joints are not visible. The stones have been joined vertically with iron dowels. In course of time they have oxidised damaging the beautiful sculptural art.

Sculptural Art

The fine work of art on the walls of the platform of the temple and the exterior of the body of the temple is exquisite and maganificient. The architect have built it like giants, but the sculptors have decorated the temple like jewellers. The whole composition consists of decorative figures like dancers, musicians, Nagas and Naginis and mythological figures, Chaitya arch designs, architectural and sculptural designs, decorative motifs, geometrical designs, floral and other vegetations etc. There are also social scenes like the king in the palace, king with the queen, slim figures with delicate curves, effective actions of the limbs, royal hunts, military scenes and processions, lady fondling baby, punishment for adultery, grand-mother's departure and various other sculptures befitting to the prevailing social and economic conditions of the 13th century A. D. There are human size erotic sculptures at different places exhibiting volupetuous sensual poses and amorous physical feats. The religious minded people explain that the erotic sculptures were intended for pyschological tests of the devotees whereas the Tantriks advance the theory of Tantrik practices. There are some who argue that the erotic exhibition was necessary for increase of population for defence purposes. There is a figure of hermit engaged in physical impulse with a damsel which exhibits human emotions, which are noticed in all the erotic sculptures covering the body of the temple. The Parsvadevatas consisting of the magestic rising Sun, mid-day Sun and the setting Sun are amazing in size, form and qualities of workmanship.

It is necessary to point out that the wheels which are about 10 feet in diameter has eight thick spokes and eight thin rods. The wheel is decorated with floral designs with animals and human figures. The scroll work, cripper designs, beaded borders and other figures have minutely been carved. The figures like presentation of giraffe to the king and the queen, the lady dancing with a drum, the lady with a pipe, the lady with a cymbal are some of the masterpieces of Konark sculptures besides the cult images. This magnificient monument is so perfectly proportionate with rich decorations on its body that it places itself as one of the most efflorescent monuments of the world.

Deputy Director, Cultural Affairs

◆

HANDLOOM DEVELOPMENT IN ORISSA

Handlooms in Orissa are expected to produce 3·70 lakh metres of fabric during the current year to meet the clothing needs of the people. This sector's achievement last year was 1·70 lakh metres of cloth.

Orissa has a population of 2.98,400 weavers with 1,04,100 looms dispersed in the country-side. This sector has sizeable potential in generating employment in rural areas for masses belonging to weaker sections.

The accepted policy of the State Government is to bring 60 per cent of the looms into the co-operative fold during the 6th Plan period. At the end of the 5th Plan, 250 working societies covering 18,100 looms were providing employment to 36,200 persons. The strategy for the 6th Plan aim at providing package of assistance for improving the skill, technique and tools of weavers and for enabling the societies to avail of working capital in sufficient measures from institutional sources.

During the current year, the handloom sector is expected to generate an employment potential of 74,000 as against 58,000 last year and 37,000 the year before.

A Small Men's Bank

SHRI R. N. MOHANTY

Puri Gramya Bank, the first Regional Rural Bank in Orissa was established on 25th February 1976 under R. R. B. Act, 1976 with its Head Office at Pipli. Sponsored by Indian Overseas Bank, Puri Gramya Bank has been growing rapidly while fulfilling its objectives of catering to the financial needs of the weaker section constituting the Small Farmers. Marginal Farmers, Agricultural Labourers, Rural Artisans, Petty Traders and Professionals who probably never dreamt a decade ago, of any institutional finance at their door steps on so much liberal terms.

By the end of first half of 1979 this humble Regional Rural Bank had collected Rupees 210 lakhs as its deposit from about 40,000 depositors. It had also advanced as on that day 366 lakhs to about 37,000 persons of small means engaged in various gainful activities. It has been possible through its 32 branches in different Blocks of Puri District which includes one at Chilka Nuapada under Krushna Prasad Block.

The share holders of a Regional Rural Bank are (*a*) Central Government, (*b*) Commercial Bank (Sponsor Bank), (*c*) State Government who hold 50,35 and 15 per cent shares, respectively. It has therefore got the financial soundness of the commercial banks and the rural touch of the co-operatives.

With the acceptance of the recommendations of the Dantwalla Committee on Regional Rural Bank the apprehensions and uncertainties regarding the future of these Banks have been cleared. It has helped to create the right pshychological environment for further development of these institutions.

An important aspect regarding this Bank is that the deposits collected are not transferred outside but invested within the district to promote its multisectoral growth.

Loaning Activities

A number of Fishermen Co-operative Societies were financed for boats and nets. For augmenting subsidiary income of marginal farmers various allied agricultural activities have been encouraged by the Bank such as Poultry, Dairy, Goatery., Duckery and Sheep Rearing. Centrally Sponsored Calf Rearing Schemes have become very popular in some of the areas.

To assist the Applique workers at Pipli in getting their raw materials at fair price a Raw Material Bank was set up under the Orissa Co-operative Handicraft Corporation. Our Bank has given working capital assistance to the Corporation which also functions as a marketing outlet for the products of these house hold industry. Similarly a number of brass and bell metal industrial societies have been given working funds as a result of which these cottage industries today have been unexpectedly activated. The Bank has also financed three Panchayat Co-operative Industries— an Oil Crushing Unit at Chandanpur, a Furniture Making Unit at Pipli and a Salt Producing Unit at Astarang.

The only Farmers' Service Society organised by our Bank continues to grow in strength at Satsankha. About 80 per cent of the house holds in the command area of the F. S. S. are members of which 70 per cent are loanees.

Minor Irrigation Programme

The Bank is implementing a minor irrigation scheme for dug-wells in Puri district for a total outlay of 21 lakhs. After completion the total area under irrigation will be 1,400 acres and by that the small farmers will have more employment through double cropping.

Antodaya Programme in Puri District

The Antodaya Programme aims at the economic development of the poorest of the poor families in every village under this programme. It is proposed to identify the poorest person in each village and prepare suitable schemes for improving his economic status so that he can be brought above the poverty line. Government of Orissa have decided to take up this programme on a priority basis. The following 29 Blocks of Puri District are covered under this Scheme:—

> Brahmagiri, Krishnaprasad, Jatni, Khurda, Begunia, Tangi, Bolgarh, Banpur, Chilka, Nayagarh, Nuagaon, Odagaon, Ranpur, Khandapara, Khandapara-II (Bhapur), Daspalla, Gania, Pipli, Delanga, Puri, Satyabadi, Kanas, Astarang, Kakatpur, Gop, Nimapara, Balianta, Balipatna and Bhubaneswar.

The scheme envisages identification of the poorest families from each village, devising methods of their uplift in consultation with Grama Panchayat and providing them with the necessary financial support for taking up self-employment and subsidiary occupations like dairy farming, poultry farming, sheep breeding, village and cottage industries etc. So that they could gradually become self-supporting and viable. The Collector is in overall charge of implementation of the Antodaya Programme and the Block functions as the basic unit of implementation at the field level. We have covered 247 Antodaya beneficiaries with an investment of Rs. 2·5 lakhs.

Integrated Rural Development Programme.

The objective of this programme is to provide full employment through productive programmes in a selected area to weaker sections of the society. The schemes are designed to generate additional employment and raise the income level of the small and marginal farmers, share-croppers, agricultural labourers, rural artisans, and persons belonging to Scheduled Castes and Scheduled Tribes.

Under these schemes the small farmers get subsidies to the tune of 25 per cent; Marginal farmers and Agricultural Labourers are eligible for subsidies to the tune of 33 1/3 per cent of the loan amount.

The following Blocks are covered under the programme :—

> Daspalla, Nuagaon, Gania, Krushnaprasad, Jatni, Odagaon, Brahmagiri, Khandapara, Nayagarh, Banpur, Khurda, Balipatna, Balianta, Pipli, Nimapara, Satyabadi, Gop and Kakatpur.

In C. A. D. A. the Bank's investment under I. R. D. P. is Rs. 7·97 lakhs extended to 610 beneficiaries while under S. F. D. A. a total investment of Rs. 17·2 lakhs has benefited 1,430 borrowers. The Bank's total investment under I. R. D. P. till May 1979 is of the order of Rs. 25·2 lakhs with 2,040 borrowers.

The Bank's efforts for still better results continue unabated both in deposits and advances fronts. The Bank has designed deposits schemes like "MAHASINDHU" and "NILACHAKRA" which are becoming very popular among its clientele.

Still it has miles to go and many things to achieve. In any case the Bank is determined to make Puri a prosperous district.

◆

Audit and Insp. Cell, Puri Gramya Bank
P. O. Pipli 752101, District Puri

MAHISAMARDINI DURGA

SHRI DASARATHI PANDA

India has a long and continuous tradition of the mother Goddess worship since pre-Vedic period. The terracotta figurines, the scene depicted on the seals and sealings clearly show that the worship was widely prevalent in the Indus valley period which is considered to be the forerunner of the later Saktism that reappeared only after the lapse of over a thousand years from the fall of Harappa. Though in the Vedic period Mother Goddess did not get supreme position as she had during the Indus' valley period, the spirit of the worship transcended throughout the Vedic literature which was crystalised more in the later period. In the Sakta period the consorts of Rudra gained prominence. The early Pali literature also throws light on the subject. The Buddhist Jatakas mention the worship of many goddesses residing in trees. The mother goddess especially the Earth maintained her position as a great goddess from time immemorial as testified from the terracotta figurines and other antiquities discovered from Navadatoli (Maheswar) and Lauriya-Nandanagarh belonging to post-Indus vallery period. The Mother goddess worship reasserted its position in the post-Vedic period and gained ground during the pre-Mauryan period. The Yaksa-Yaksini cult was fairly popular during this period as we find its depiction from Bharhut, Bodha Gaya, Sanchi and in Orissa. A number of crude and robust images of Yaksha and Yakshi and Nagas and Nagis of this period are preserved in the Orissa State Museum.

In the epic age Sakti was invoked for power. Two separate hymns in the Mahabharata are devoted to Durga. In the Virataparva Durga is regarded as the wife of Narayana and in the Bhimsaparvan as the wife of Siva. In the Harivamsa, she is assigned a permanent place in the Vindhyas (with her title Vindhyavasini). She is also given the familiar epithets of Kaumari, Kali, Kapali, Chandi, Katyayani, etc. During the Sungra-Kusan period sculptured reliefs from Sanchi, Bodha-Gaya, Amaravati, Mathura and Gandhara throw considerable light on the worship of the Mother Goddess. During this period all the principal goddesses had began to take concrete form and Durga the consort of Siva, emerged as the most popular but powerful goddess.

During the Gupta period the consorts of the Hindu Trinty—Brahma, Vishnu and Mahesvara were associated and emerged as female cults. It was during this period Durga emerged as the most powerful goddess in India. The Puranas, the last great authority on Saktism popularised the tenets of Saktism and upheld numerous manifestation of Durga with iconographic features. Thus Saktism occupied a pre-eminent position in religious arena and crept into mainstream of Indian religions—Saivism, Vaisnaism, Buddhism, Jainism, etc.

Durga, popularly known as Mahisamardini, appeared under various names such as Devi, Kali, Karali, Ambika, etc. but Durga became the Supreme object of adoration in the Sakti cult and assumed the names of Adisakti, Mahamaya Katyayani. She was conceived as' the supreme creator the primordial energy and was connected with Lord Siva.

In the later Puranas particularly the Devi Mahatma section of Markendeya Purana (5th-6th century A. D.) her exploits are recorded forcefully raising her position to a sublime peak as Devi—all powerful, all pervasive, creator, preserver and destroyer of the universe.

In the Siva Mahapurana Durga has been spoken of as knowledge and ignorance both, beloved of Sambhu, mother of the three gods and formless. She is Savitri, also Pravriti and Nivriti of the world and the preserver of the world and she is Mahasakti and Sanatana. She is preserver, creator and destroyer of the world. She is supreme knowledge, supreme power, supreme mind, supreme memory and great delusion.

The origin of Durga is very interesting. According to Skandha Purana when Giant Durga became a terror for the Gods, Siva took pity and asked Parvati to kill Durga. She first of all sent Kala-ratri. But she took to heels when the Giant advanced. Then Parvati herself fought with the Giant, sitting .on Mount Vindhya. The Giant took the shape of elephant but Parvati tore him to pieces with her nails, then he took the form of Buffalo, but again getting the blow of trident the Giant came back to his original form and with thousand arms and was finally killed. Since she killed Durga, she became Durga. In this verson of the story she is associated with the killing of Buffalo demon (Mahisasura and this form of the great goddess is very popular. There are also other Puranas like Markendeya Purana, Vamana Purana, Kalika Purana, Varaha and Bamana Purans which give different stories about the origin of the great goddess. But the gist of all the different versions of story is that a fierce battle ensued between the goddess Durga and Buffalo demon in which the latter was defeated and slain by the goddess.

Durga, after her valrous exploits in th war against the demon (including Mahisasura) was regarded as a supreme deity, and she gradually outgrew the terrific character of her feminine nature, the commonest type of which represents in the form of Mahisasuramardini. She appeared in literature, art and in scupltures with iconographic features. Durga—Mahisamardini, conceived as killing the buffalo demon, variously armed should plunge her trident (Sula) into the neck of the demon. She should have three eyes, high breast, a thin waist, and three bends in her body, with Jata mukuta. The decapitated trunk of the buffalo, with blood gushing from the neck, should lie at her feet and the real Asura, two-armed, carrying sword and shield, terrific in appearance and having knitted eye-brows, should be visible half-emerged from within the neck of the buffalo. The right leg of the Devi should be planted on her vehicle, Lion while her left leg should touch the back of the buffalo, the lion molesting the Buffalo-demon. Various texts differ mainly with regard to the number of arms the goddess should have.

The earliest sculptural representation of Mahisamardini Durga, can hardly be dated before the Gupta period and some miniature stone figures unearthed at Bhita are a few of the earliest summary representations of this aspect of the goddess. The discovery of quite a number of images of Mahisamardini from Mathura, Besnagar push the date anterior to that of Gupta period. The discovery of a terracota plaque from Nagar or Karkotanagar, now preserved in the Museum at Amar, Jaipur is detable first century A. D. This teracotta plaque depicts the goddess as four-armed, with lower right hand placed on the back of the buffalo, while upper right hand holds a trident, the tail of the animal is erect. Though the quality of workmanship is poor the execution is successful. One of the remarkable reliefs belonging to the Gupta period unearthed by Marshall at Bhita depicts the goddess subduing the Buffalo-demon unaccompanied by her vehicle or any accessory figure. It is carved out of the local sand stone, the two-armed goddess with her left hand placed on waist has a trident in her right hand She is piercing it into the neck of the demon. She is also seen pressing the head of the demon under her right foot.

With this at the background I concentrate my discussion on the Mahisamardini images that evolved in Orissa through the ages. This Mahisamardini form of great Sakti made its appearance in Orissa since very early times. The earliest representation of the deity is offered by the two armed Viraja at Jajpur in Cuttack district. This two-armed goddess, mounting on a lion holds in her right hand a spear which pierces the body of the buffalo and in her left hand she pulls the tail of the animal. Her right foot presses the head of the buffalo. She also corresponds to the image at Bhamra. Dr. R. P. Chanda places this type of Mahisamardini to the pre-Gupta period, but Dr. K. C. Panigrahi dates it to the Gupta period. Whatever might be the age of the present image of Viraja, the two-armed variety represents the earliest phase of the cult in Orissa. This two-handed Mahisamardini Durga which represents the earliest phase in chronological evolution is also found at Somesvara near Kakatpur of the Prachy valley. She is contemporary to Viraja of Jajpur and assumes the similar iconographic features.

We come across four-armed Mahisamardini Durga at he Motia in Gobindapur P.-S. of Niali block in Prachi valley area. She holds Chakra and conch in her upper two hands while the remaining two lower hands are engaged in piercing the trident into the heart of Mahisasura. The dazzling appearance and pose of attacking Mahisasura by the goddess create sensational feelings in the mind of the visitors. Such images are also seen in the temple of Madhava at Niali and on the western wall of the temple of Charchika at Banki.

A unique image of four-handed Mahisamardini is found at Markendesvara temple in Bhubaneswar. Here the demon is the riomorphic, i. e., in the shape of a Buffalo. The goddess lifts the buffalo by the tail and thrusts the trident through the demon's body with the other. This image except the four hands resembles the image of Mahisamardini now enshrined as the deity in the temple of Viraja at Jajpur. Dr. K. C. Panigrahi, comparing the image at Markendeswar with that of the image of Mahisasurmardini in the Siva Temple at Bhumra fixed the date to the sixth century A. D. A four-armed Durga image is also found in Parsurameswar Temple (C. A. D. 650) at Bhubaneswar. The goddess holds an akshamala, a khetaka flower and a vase in three of the hands and the palm of the fourth hand is shown up turn with a rosette on it. In central niche towards the south of the Vaital Temple (C. A. D. & £) a four-handed Durga is also found. It holds a japamala, a sula, a khadga and a vase in her four hands and two attendants on either side. Another image of such group known to us as Dwara Vasani is worshipped in the eastern edge of the Vindusarovara at Bhubaneswar.

The two, four and six-armed Mahisamardini images discussed above are not widely distributed in Orissa as in the other forms with more hands. They can be assigned to the period in between the Gupta rule and the Bhauma rule in Orissa.

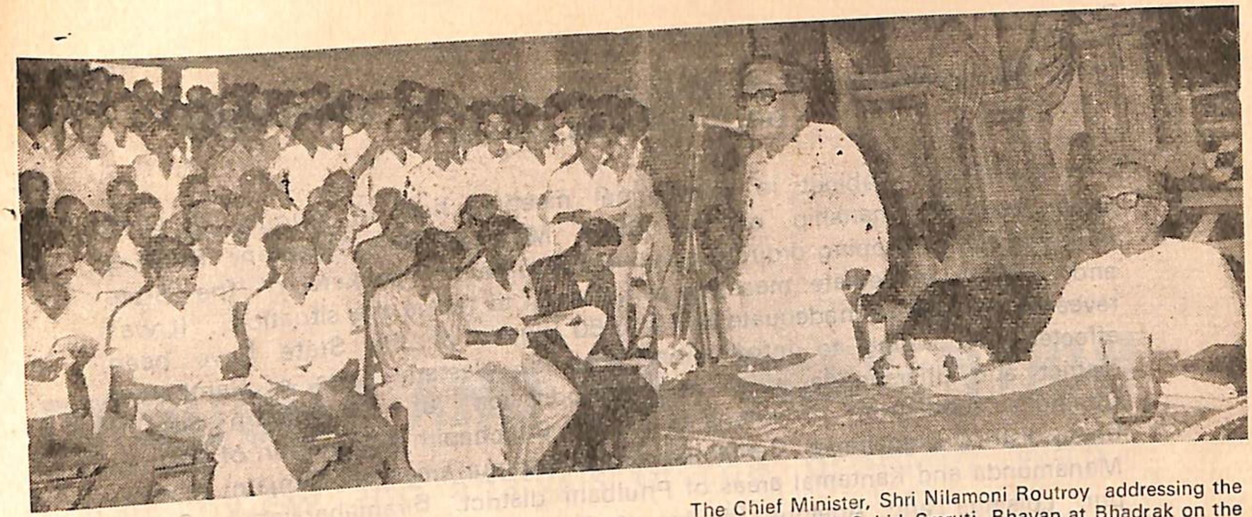
Eight-armed Mahisamardini images came into existence in Orissa in the Bhaumakara period (C. 736—C. 948 A. D.). These images were worshipped according to tantric rites. One image of this variety is found at Haripur in Mayurbhanj district belonging to the 9th-10th century A. D. This eight-armed image is in an aggressive pose where the three prongs of the tridart pierce the upturned neck of the human, demon issuing out of the decapitated trunk of the animal, the lion also taking part in the fight. This Haripur sculpture portrays with success the dynamic vigour underlying the act and the demon is given modified form by the sculptor. She closely resembles her counterpart of Aihole. Other such deities are found at Kanakpur and Devidol in the Cuttack district. They are at present known as Sarala and Katakachandi respectively. Both the images are similar in so far as they hold sword, bow, arrow, trident, discuss and bell in six of their hands. Both of them differ from each other in so far as the former hol book and lyre whereas the latter holds shield and Kharpara in two of their hands. This variety of Mahisamardini is found at Mangalpur near Kakatpur, Amanakuda near Niali and outer wall of the Rameswara temple near Nayahat. We also notice an interesting eight-armed Mahisamardini image near the Brahmeswar temple (under a banyan tree) at Bhubaneswar. The goddess is engaged in a fierce sea-battle, with the demon issuing out of the decapitated trunk of a buffalo. She holds discus, shield, snake and arrows in four of her hands whereas her other four hands are badly damaged. Scene of such naval war between the goddess and the demon is extremely rare. The image can be assigned to the ninth century A. D. Similar Mahisamardini images are also found in Vaital temple at Bhubaneswar, where the buffalo-demon has been represented with a human body with the head of a buffalo having two horns. The temple of Sisireswar at Bhubaneswar preserves two such images similar in execution and iconography. All the images of this variety are seen standing in *pratyalidha* pose and fighting vigorously with the demon who emerged out of the decapitated trunk of the buffalo.

Ten-handed Mahisamardini was even more common and popular in Orissa. Availability of this variety of image in different parts of Orissa either as presiding deities or as side deities indicates its wide distribution. In this form the goddess is depicted as the war goddess with full energy produced from the flames of the gods and bearing the *ayudhas* of the gods such as Siva's trident, Visnu's disc, Varuna's conch, Agni's dart, Yama's iron rod, Vayu's bow, Surya's arrows, Indra's thunderbold, Kuvera's mace, Brahma's rosary and pot, Visvakarma's sword, Himavan's Lion and various weapons of other gods. Of numerous ten-handed Mahisamardini mention may be made of the beautiful images found at Dalavada, Pitapura, Lataharana, Nivarana, Niali, Someswar, Jogeswar and Kakatpur of Prachy valley, Ambapara near Chaurasi, Bhattarika near Baramba, Kanakadurga near Remuna, at Khiching Museum in Mayurbhanj district, Padhuan near Basudevpur, Birajai at Katual eight miles from Banapur. The goddess is eight handed. But the peculiarity is that the goddess sits on a full blown lotus which comes out from the naval of Siva who is lying with His right foot on the left. Siva wears a garland of human skull.

The ten-handed Mahisamardini at Ambapara near Chaurasi in Prachy valley has two lines of inscription which indicate the name of the image as Bhattarika and on palaeographical ground may be assignable to Circa 9th-10th century A. D A ten-handed Mahisamardini is also found in Palia, four miles from Dolasahi at South Balasore, two such images are at Khajureeswar, near Balasore, an image in the Podasingidigada in the Keonjhar district at Uttarayani near Balugaon, another is at Balasore Museum.

During Ganga rule in Orissa art and architecture embarked upon a new phase of devolopment with more elaboration in ornamentation. The Sakti images made during this period are considered to be gems in the plastic art of Orissa. Along with ten-handed Mahisamardini we come across twelve-handed and eighteen-handed ones with detailed iconographic features. Mention may be made of 12-armed images in Prachi valley and an 18-armed image in Maninageswar temple near Balasore town. Here it may be stressed that of all the forms of Sakti Mahisamardini is still revered by people of all sects as the Supreme Devi.

Librarian, Orissa State Museum,
Bhubaneswar



The Chief Minister, Shri Nilamoni Routroy addressing the gathering in the Sahid Smruti Bhavan at Bhadrak on the occasion of the celebration of Local Self-Government Day on the 31st August 1979. Dr. Harekrushna Mahatab attended the function organised by the Bhadrak N. A. C. as the Chief Guest.

Chief Minister, Shri N. Routroy garlanding the statue of Mahatma Gandhi in the premises of Orissa Legislative Assembly on the 9th August 1979 on the occassion of observance of 9th August.

Shri S. M. H. Bureny, I. A. S., Chief Secretary, Government of Orissa inaugurating the Cultural function of Home Department by lighting candles at Rabindra Mandap on 22nd August 1979.

GOVERNMENTAL MEASURES TO COMBAT DEVELOPING DROUGHT SITUATION

The Orissa Cabinet in an informal meeting held on August 22, 1979 under the Chairmanship of the Chief Minister, Shri Nilamoni Routroy reviewed the developing drought condition in different pockets of the State and decided immediate measures to be taken to tackle the situation. It was revealed that due to inadequate rain fall, 50 Blocks of the State have been affected. According to information received, western parts of Sambalpur district and Jharsuguda area, Sadar Subdivision of Sundargarh district, Champua subdivision of Keonjhar district, Panchapirh subdivision of Mayurbhanj district, Digpahandi, Berhampur and Chatrapur areas of Ganjam district, Manamunda and Kantamal areas of Phulbani district, Biramaharajapur, Sonepur, Loisinga and Agalpur Blocks of Balangir district and Khariar area of Kalahandi district are reported to have been affected due to inadequate rainfall.

In order to tackle the situation, the Collectors have been asked to make immediate arrangement of pooling the pumps available with Lift Irrigation, Grama Panchayat and Co-operative departments and press them to service in the affected pockets. Government have also decided that 75 per cent of the cost of the hire charges of the pumps will be subsidised. Besides, it has been decided to ensure speedy energisation of private wells in the affected areas. In the western region, wherever possible measures will be taken to construct cross bunds and divert the nullah waters to the lands with standing crops.

It was decided to intensity the 'Food for work' programme in the affected areas for which sufficient food grains would be available on priority basis. For this purpose 5,000 tonnes of food grains will be made available and Government of India will be requested to immediately release 50,000 tonnes of wheat in addition to the annual quota for meeting the situation.

The Collectors have been empowered to take up rest relief work immediately in the affected belts and to expedite the development works in the affected areas.

For meeting fhe drinking water needs in the affected areas, the number of drinking water wells will be increased under the Accelerated Drinking Water-Supply Programme.

Similarly the nutrition programme for children and expectant mothers in the affected areas will be made more extensive.

For encouraging cultivation of Rabi crops, sanction of Tuccavi loan will be expedited.

Besides the above measures, it has been decided to strengthen the public distribution system and to open a large number of Fair Price shops in the affected areas to save the distressed people from exploitation.

DROUGHT AND ITS PREVENTION

(A review and analysis of the problem with remedial measures suitable for Orissa)

SHRI G. MAHAPATRA

Heavy floods, post-monsoon cyclones, and drought, are by and large, the three main natural calamities responsible for limiting crop production and even total failure of crops in extensive areas of the State of Orissa. But, while the floods and cyclone are generally limited to coastal districts and deltaic region, generally the drought is widespread, and extends over the land-locked districts and coastal districts as well. It can be safely said therefore, that the greatest single factor limiting the agricultural production in the State, is the vagaries of monsoon, and agriculture in the State is a gamble in its hands.

Drought in Orissa

The State on an average gets a rainfall of 1482·2 mm. per year. (Based on 50-year average, Memoirs of the Indian Meteorological Department, Volume XXXI, Part-III). Very few countries in the world and even other States of the Indian Union can boast of an average rainfall of this magnitude. But uncertainty and uneven distribution, specially a long dry spell in the middle or late of September in Orissa, brings in too low crop yield or large scale failure of crop in the State. Meteorologists have generalised and have calculated the possibility of deficient rainfall resulting in drought conditions in Orissa (Koteswaram-1970). The following table (Table I) worked out indicates that Orissa has almost reoccurrence of drought once in every five years.

TABLE I

Meteorological Subdivision	Recurrence period of highly deficient rainfall
Assam ..	Very rare, once in 15 years.
West Bengal, Madhya Pradesh, Konkan, Coastal Andhra Pradesh. Madhya Maharastra, Kerala, Bihar, *Orissa*.	Once in 5 years
South Interior Mysore, East Uttar Pradesh, Viderbha,	Once in 4 years
Gujarat, East Rajasthan, West Uttar Pradesh, Tamil Nadu, Kashmir, Rayalseema, Telengana.	Once in 3 years
West Rajasthan ..	Once in 2·5 years

Such generalisations of drought conditions over a State as a whole, have little and limited utility. This hardly throws any light about severity of the droughts of the timing and duration of dry spells (Sen 1967).

Historical records show that Orissa had, at various times suffered from terrible famines as a result of drought. The *Naankadurvikhya* of 1865-66 is probably one of the worst famines in Orissa, when lakhs of people died of starvation. Great famines are said to have occurred in the 14th, 15th and 16th centuries during the regions of Raja Kapilendra and Pratap Rudra Deo, etc. The great famines of Bengal in the year 1770 was very grievously felt in Orissa. In 1858 Col. Arthes Cotton Commandant reviewed the drought and famine conditions prevailing in the State for twenty-three years back to 1858, and came to conclusion as follows:—

Year		Nature of calamity
1836-37	..	Famine
1837-38	..	Famine
1840-41	..	Famine
1841-42	..	Drought
1842-43	..	Drought
1849-50	..	Drought
1850-51	..	Drought

Thus in 23 years there was famine for 3 years and drought for 4 years [Drought in Orissa 1954-55 final report of Government of Orissa, Revenue (Special Relief) Department, Bhubaneswar].

The position of drought and natural calamities have heen reviewed by the Board of Revenue, Orissa (Agriculture Census, 1970-71) for the decade beginning from 1965. It has been found that in the year 1965 alone there was an estimated loss of 22 lakh tonnes of *Kharif* paddy. The year 1966 was also not very favourable and dry spell in the post-monsoon period, affected medium and late paddy to a large extent. The estimated loss of Kharif paddy was to the tune of 13 lakh tonnes that year. In 1967 unprecedented floods due to heavy rains and cyclones followed by a post-monsoon failure caused heavy loss in yield of medium and late varieties of paddy estimated to be of the order of 12 lakh tonnes. Besides, loss of about 2 lakh tonnes was there due to floods. In the year 1968 cyclone and localised drought conditions were responsible for loss to a tune of 12 lakh tonnes of paddy.

In 1969 intermittent floods in two occasions followed by drought, which was sporadic and localised was responsible for an estimated loss of 9 lakh tonnes. The year 1970 saw more floods than drought. However sporadic or localised droughts did occur and the estimated amount of loss of paddy was of the order of 2 lakh tonnes.

In 1971 there was a loss of 8·4 lakh tonnes of paddy due to drought (White Paper, 1971). In 1972 there was also localised drought and it continued till end of June 1973. One of the worst drought years which was widespread was 1974 in which as many as 2,478 Grama Panchayats out of 3,826 Grama Panchayats were affected. The year 1976 was again a year of widespread drought. It has been reported that about half of the population of Orissa were affected by drought and drought conditions have been responsible for a loss of 50 per cent crop over 1,724 Grama Panchayats, 25 per cent over 637 Grama Panchayats (The Samaj, dated the 24th November 1976). In summary it can be said that during last fourteen years beginning from 1965—1979, there has been widespread and acute droughts over four years. That is the year 1965, 1974, 1976, 1979, are the four years of acute and widespread droughts in the State leaving other ten years having minor and localised droughts.

Analysis of Rainfall

In Fig. I Histogram of the average monthly rainfall of the above four (i. e., 1965, 1974, 1976, 1979 up to August) drought years against 50 years average monthly rainfall have been plotted. A study of the figure would indicate that in these drought years not only the total amount of rainfall was much less than the average, but the distribution was erratic. The total rainfall in mm for the drought years was 992·1, 951·2, 1177·28 for the year 1965, 1974 and 1976, respectively. (The total expected rainfall of 1979 is yet to be computed but figures up to August has been plotted). This amount of total rainfall in drought years can even sustain a reasonably good yield of paddy, provided it is well distributed. An analysis of the distribution of rainfall of the worst and widespread drought years (See Fig. I) indicates that in these years the monsoon was unreliable both at the beginning and at the end. Failure of pre-monsoon showers is critical, since with the available implements and draft animals at their disposal, the farmers cannot prepare lands nor can establish nursery plots untill the monsoon breaks. And if this is delayed as happened in the year (1976) and is followed by a post-monsoon dry spell, the drought effect on the yield of paddy is very acute and drastic. This is specially so because of the fact that most of the paddy varieties in common use in the State require round about 100 days before the critical growth stage of grain formation. It is a well known fact that paddy is more susceptable to moisture deficit during the period from flowering to drough stage, than from earlier stage of showing or transplanting to tillering (Lenka 1976). Thus a dry spell in mid September-October is very critical on the yield of paddy and the effect becomes more prominent, if there is a delayed monsoon. In short both pre and post-monsoon erratic rainfall in a particular year brings in acute shortfall in yield and prospect of *Kharif* paddy under rainfall conditions in the State. Moreover a study of rainfall pattern (Fig. I) also indicates that even in drought years the rainfall in July—August months are not much away from the normal and even if it is little less, it does not tell upon the yield, as it is adequate to sustain a normal paddy crop, provided there is no post-monsoon dry spell when the paddy is in flowering.

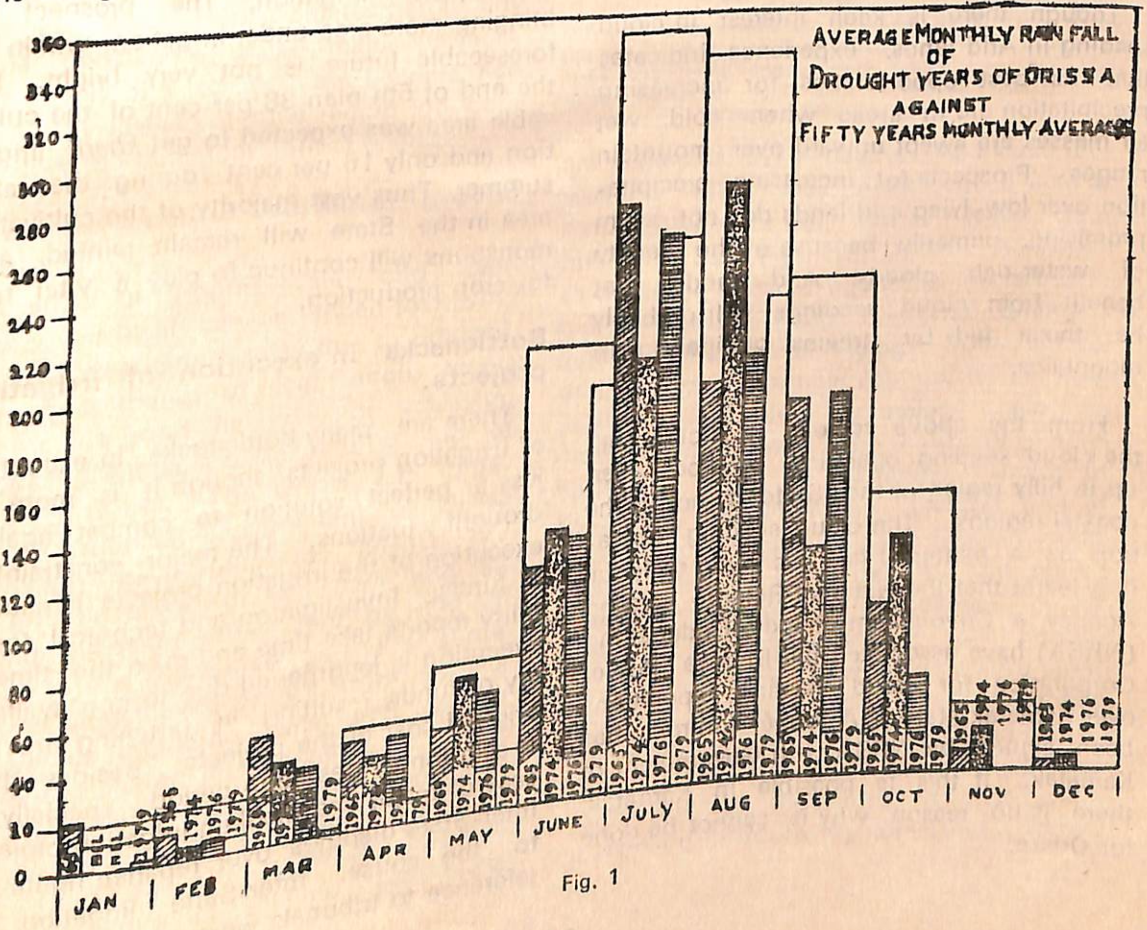


Fig. 1

Artificial Rain

Successful attempts to 'seed' the cloud to rain can be done to mitigate the ill effects of drought. But a major stumbling block in this approach is that nothing can be done where no clouds exist. (UNESCO's programme for Arid lands 1958). The scientific approach on this has been reviewed (More water for Arid lands—National Academy of Science, 1974). "It is said certain cloud formations contain supercooled water; rainfall augmentation hastens precipitations of this water. Adding ice, forzen carbondioxide and silver iodide—whose crystal shapes promote condensation (nucleation) of supercooled water cause dramatic ice-crystal formation and produces rain". This method is known as cloud seeding,

To produce rain by cloud seeding. one must always have the right meteorological conditions. Even then the seeding can some times lead to more precipitation, can some times lead to less precipitation, and at other times the nuclei have no effect.

Though there is keen interest in cloud seeding in Arid lands, experience indicates that its best opportunities for increasing precipitation are in areas where cold, wet air masses are swept upward over mountain ranges. Prospects for increasing precipitation over low-lying arid lands do not seem promising, primarily because of the scarcity of water-rich clouds. Arid lands that benefit from cloud seedings will probably be those fed by streams originating in mountains.

From the above review, it is clear that the cloud seeding operation can be taken up in hilly region of the State, if not in the coastal regions. The cloud seeding operation as a matter of fact has come to India. It is learnt that the National Remote Sensing Agency, a Government of India Undertaking (NRSA) have associated the Mysore Power Corporation for cloud seeding operations over Karnatak state. A formal contract has been signed by NRSA with Government of Karnatak. If this is possible in Karnatak, there is no reason why it cannot be done for Orissa.

Irrigation

Irrigation as a preventive measure for drought have been long since recognised. Feasibility of irrigafion in the State, is quite favourable. The rivers of the State carry a mean annual run-off nearly 121 million acres ft. or roughly 1/10th of the total run-off of the entire river system of India (Khosla, 1963). The run-off, however, is uneventiy distributad and there is too much of water during monsoons resulting in peak-floods and too little during post-monsoons, resulting in failure of crops. The Engineer-Governor of Orissa Dr. Khosla has thus rightly pointed out, that Orissa has "poverty amidst plenty". The rivers of Orissa can be harnessed for irrigation and power and ravages of floods and drought can be automatically controlled.

With all the endeavour, however, during last plan periods till the end of the year 1973-74, the State have brought only 15 per cent of the net area shown under protective Irrigation during the *kharif* season and about 4 per cent of the net areas under rabi/summer irrigation. The prospect of bringing more area under irrigation within a foreseeable future is not very bright. By the end of 5th plan 38 per cent of the cultivable area was expected to get *kharif* irrigation and only 16 per cent during the rabi/summer. Thus vast majority of the cultivated area in the State will remain rainfed, and monsoons will continue fo play a vital role for crop production.

Bottlenecks in execution of irrigation projects.

There are many bottlenecks in execution of irrigation projects though it is more or less a perfect solution to combat against drought situations. The major constraint in execution of the irrigation projects is paucity of funds. Investigation and technical feasibilify reports take time and even the time of execution is lengthened due to non-availability of funds, resulting in fattening up the original cost of the projects, Besides there is aslo longer gestation period, specially in case of major and medium irrigation ptojects. Inter-State disputes over reparian rights add to the couse. Inter-State litigation and reference to tribunals worsens the issue and years and years pass without any concrete results. Minor irrigation projects are not only quick in execution, but also less problematic specially as regards submergence, and consequent rehabilitation problemes. They demand little foreign exchange component unlike major river valley projects. As such Minor Irrigation Projects should be given preference over major and medium projects in the State. But, by the end of 1973-74 only 228 thousand hectares have come under irrigation under different Minor Irrigation Projects as against 586 thousand acres under major and medium irrigation projects. By 1978-79 the expected area to come under major and medium would be 791 as against an area of 247 thousand hectares to come under minor irrigation projects. Thus embhasis to execute more minor irrigation projects has not been given in the State which warrants attention of the Administration. Another point in favour of Minor Irrigation Projects, is that due to more number of such projects that can be executed due to comparatively less capital investments, these projects can be taken up in extended and large areas in the country side. Thus it creates hardly any regional imbalances unlike major projects, where people of a region may become rich and wealthy leaving another region too poor and below the minimum normal needs.

Lift Irrigation and utilisation of ground water.

Utilisation of ground water and even surface water by lift can be tapped for saving crops from weathering away due to drought. Lift irrigation, though of recent origin seems to have made good headway in achieving 63 thousand hectares under *rabi* by end of 1973-74 in Orissa. The Orissa Lift Irrigation Corporation (A Government of Orissa undertaking) have plan to cover 127 thousand hectares under *kharif* and 82 thousand hectares under *rabi* by end of 1978-79. It is presumed that the above target will be achieved by lift from surface water bodies including rivers and ground water by mechanical lift as well as by power pumps by sinking opon wells, deep tube-wells and 'filter point' tube welis (Pradhan,) 1976). The Orissa Lift Irrigation Corporation have also in mind shallow tube-wells and utilisation of cheap materials even *split bamboo* as pipes. Large scale demonstration of these types of tube-wells even on beds of rivers to supply drinking water, as weel as water for irrigation, should be done to popularise the programme.

Horizontal wells and Qanats

A suggestion which can be adopted in Orissa and can be investigated by the Orissa Lift Irrigation Corporation is the Horizontal wells and *Qanats*. The Orissa Lift Irrigatjon Corporation is learnt to have Geohydrologists who can locate possible sites for the purpose. Good sites for horizontal wells are geological dykes having impervious rock walls, or tilted clay mass which acts as natural barrier for the 'Cased' water on a hill side (See Fig. II). Drilling horizontat to drain the arrested aquifer is necessary to tap the water. Though horizontal drilling is quite a different technology from vertical drilling, simple portable equipments are now available and the technology can be mastered in no time. The feasibility of such horizontal wells in Kashipur areas of Kalahandi, Bhuyanpir and Juangpir area of Keonjhar and agency areas of Ganjam seems to be bright. As a matter of fact spring seep and moist soil on hill slopes in dry season are possible sites for trial boring. Occurrnence of Phreatophyte, tree slike Jamu (Eugenia jambolna) and Simuli (Bombax malabaricum) are also good indicators. Horizontal wells may be a new idea for our country but two thousands of such wells are working in South-Western United States.

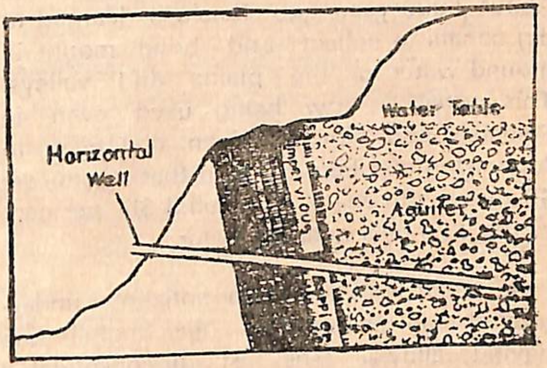


Fig. II

A schematic presentation of a Horizontal well, Good sites for Horizontal wells are geological dykes of impervious rocks, that forms underground natural Dam. Fig. from "More water for Arid lands"—National Academy of Sciences, Washington D. C.

They have a special advantage since flow irrigation is possible, and once they are installed they can be used for years without much maintenance. Horizontal wells can be fitted with pipe fittings and values to draw water as and when required, and can be stopped when not required, or even can be regulated as per requirement. The yield of water however varies with the nature and height of the aquifer but on an average 10—40 litres/minute discharge is possible from such wells (More water for Arid lands-National Academy of Sciences, 1974).

Qanat is a Persian word meaning Canal. About 3,000 years ago Persians learned to dig qanats to collect and bring mountain ground water to the plains and valleys. This system is now being used even in Pakistan and North African countries. In Afganistan and Iran it is said that there are 40 thousand qanats that fulfill 35 per cent of the country's need of water.

A *qanat* is essentially a horizontal underground man-made tunnel near a hill side having alluvial fans of unconsolidated debris (colluvium) from which under ground water is tapped and led by gravity flow to the plain below (See Fig. III).

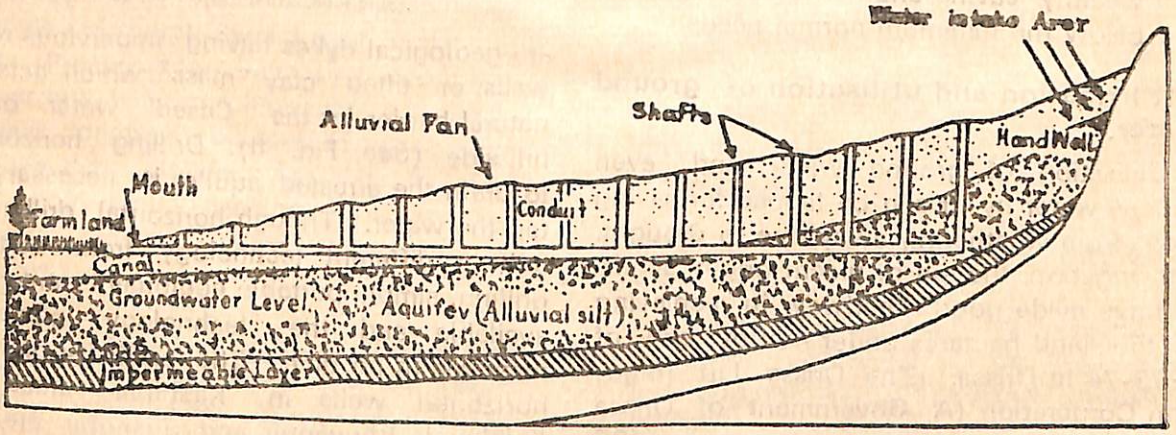


Fig. III

Exploiting the gradient of the natural terrain, a qanat system is a series of wells dug into an underground water supply and connected by underground channels that convey water by gravity to the ground surface at lower levels (Based on a diagram in Scientific American, Wulff, 1968 – Diagram rom More Water for Arid Lands—National Academy of Sciences, Washington D. C,).

The *qanat* system is composed of essentially three parts. First of all one or more vertical head wells (See Fig. III) are dug at the head of the alluvial fan for collection of water. In the second stage a gently sloping down ward horizontal tunnel is dug leading not only water from the head well but also acting as underground tunnel or sub-surface drain to collect seepage from above. In the course of tunnel excavation a series of vertical shafts are dug for ventilation and removal of excavated debris.

Qanats have distinct advantage, since no power is necessary for irrigation, once they are constructed. But the very procedure of construction and underground tunneling requires high grade of skill and technical know-how, where Geohydrologists and Engineers play greater role. The initial cost though high. commensurates with the low cost of maintenance and supply of irrigation facilities in sub-mountain range where it is possible to grow off-season vegetables and English vegetable crops (like cabbage, cauli flower, beet and carrot etc.) for production of seeds in the tropics.

Utilisation of small bridges and culverts for irrigation

One of the ex-Chief Ministers of Orissa, Shri Biswanath Das, wrote in a local Oriya Daily (The Samaj, dated 1st February, 1974] that the drought conditions can be mitigated to an extent of 75%, if the road bridges and culverts are designed in such a way, as to impound water, when the heavy showers of monsoons are over. This he suggested to utilise forsirrigation either by flow or by lift. In Orissa apart from National Highways and State Highways, there is a good mileage overed by *Pucca* and *Kacha* roads, which have been constructed over various natural drainage channels, including small streams, gullies and waterways. Often a pucca bridge, a culvert or a submergible causeway have been constructed to keep the road connected during fhe monsoons. Thousands of small bridges and culverts of this type can be fitted with emergency wooden/iron shutters with very little extra cost, to act as an impounding structure. It may be that all the sites where a culverts or a bridge have been constructed, are not suitable for such purpose but technical feasibility seems to be bright and with little extra cost these culverts, bridges or causeways can be converted to good water impounding structures to save the crop and give life saving irrigation during droughts if not a regular flow irrigation.

Water Harvesting

Harvesting the run-off from hills and steep slopes to utilise the same for agriculture, is an approved practice under soil conservation programme. The run-off from the hills is oriented through diversion channels at the foot hill region to convenient points, either near to the head of a gully or to a depression where the harvested run-off is impounded by a small dam for subsequent use, down below the slope. The State Soil Conservation Organisation is learnt to have completed 255 number of water harvesting structures in the remote rural areas of the State. These projects have become so popular, that people even have contributed up to 25 % of the cost of such projects to be executed in their villages. However, the catchment of such projects being small, the water yield is low and in some cases it is not possible to have water in the pondage area, right in summer months. The water, which is lost mainly by percolation and seepage is however available downstream, for crop production, since the moisture regime of the downstream side is enriched and cropped area in the downstream are saved from drought by the increased moisture regime of the area.

Percolation and seepage loss can also be minimised by soil compaction. Herds of buffaloes may be allowed to trample and wash themselves to aid compaction. Various chemicals like Bentonite clays and Asphalt have been tried else where with promising results. Much seepage is caused by calcium in soil and if replaced by sodium, can aid in minimising seepage loss due to its floculating action on clay. Sodium carbonate has been successfully used for such purpose. Even *Sajimati* (Raw sodium carbonate) can be used. Washermen may be allowed to wash clothes which may aid in seeling up due to the release of extra sodium carbonate from the dirty linen, which they wash. Percolation losses may be avoided by lining the reservoir with polythene sheets or even with cement concrete lining. This, however, is costly and should be carefully examined to commensurate with the benefits.

Reducing evaporation losses, can also be tried for small farm ponds and water harvesting structures. Many a times evaporation being an invisible loss, is not recognised to the extent it merits. From small reservoirs and farm ponds with large surface area open to air, evaporation losses often exceed the amount of water that is used productively. (More water for Arid lands National Academy of Sciences, 1974.) In order to reduce evaporation Aliphatic Alcohols (Cetyl Alcohol), which form a monomolicular layer has been tried. But it has limitations, since it not only breaks with wave and wind action, but absorbs solar energy and heats up the water below more than what ordinarily it would have been, but for the over lying layer, since cooling effect due to latent heat of evaporation has not been operative.

Wax blocks have been successfully tried in Arizona and is said to have lasted for four years without replacements. In cold weather it cracks and surface is rebuilt with hot sunny days before evaporation begins. The effect on aquatic flora and fauna has however not been reported.

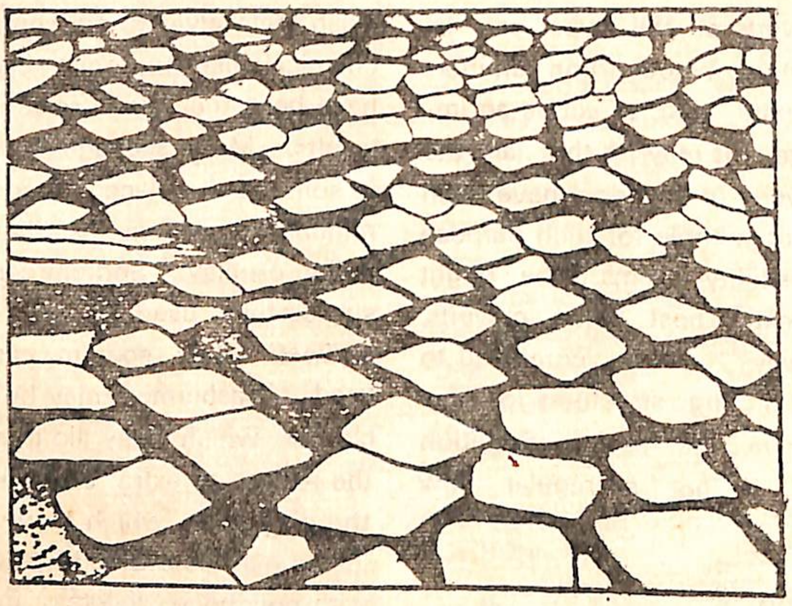


Fig. IV

Evaporation control in small ponds light weight concrete slabs, Picture shows here 2" thick floating slab of polystyrene, sand and cement. Exposed surfcce of each slab is painted white to reflect the intense sun rays responsible for quick evaporation. The specific gravity of material is about 0·8 and 80 percent of the floating slab is submerged, reducing the possitbility of piling up by heavy winds. Submerged portion of the slab is coated with bitumen for durability and prevent the material from being affected by water. Slabs have rounded corners to permit the large body of water underneath to breathe properly to save the aquatic life (National Institute for Water Research, South Africa Pic. from More Water for Arid Lands—National Academy of Sciences, Washington D. C.).

The most successful effort for reducing evaporation losses is done by floating solid thin laminar light weight non-conductive blocks. Plastic, light weight polystyrene, and eved cement concrete slabs which floats due to light weight of the concrete (aggregate) used, have been tried successfully (See Fig, IV).

Conservation of Moisture

Conservation of soil moisture is very essential specially for upland under unirrigated conditions. Generally this is lost sight of as conservation of moisture is some what not very visible to common man. In Orissa there is more than 3,461 thousand hecteres of uplands distributed over the 13 district (See Fig. V), which are generally cultivated without any bunds or terraces. The uplands locally known as *Guda* (Keonjhar); *Pada* (Ganjam); *Dahi* (Mayurbhanj); *Taila* (Dhenkanal); *Aat* (Sambalpur and Balangir) and *Thenga* or *Ragadi* (Cuttack). These lands certainly can fight drought conditions much better, if more moisture is conserved in the soil and run-off is checked as far as practicable. Due to the sloping nature of these lands the rain water gets an easy access to flow down the surface. It does not get time to infiltrate. By putting bunds and terraces and by plugging gullies one can make the run-off to stand on the surface and improve the moisture regime of the soil. The effect of large scale bunding of uplands has beneficial effect not only on the moisture regime of uplands but also on the low lands due to infiltration. A study made by the State Soil Conservation Organisation (Drought and it's Prevention, 1966) reveals the effect of damage due to drought in the year 1966 in different blocks treated with comprehensive soil conservation measures, as compared with the district average loss in that year due to drought, was much less (See Table II).

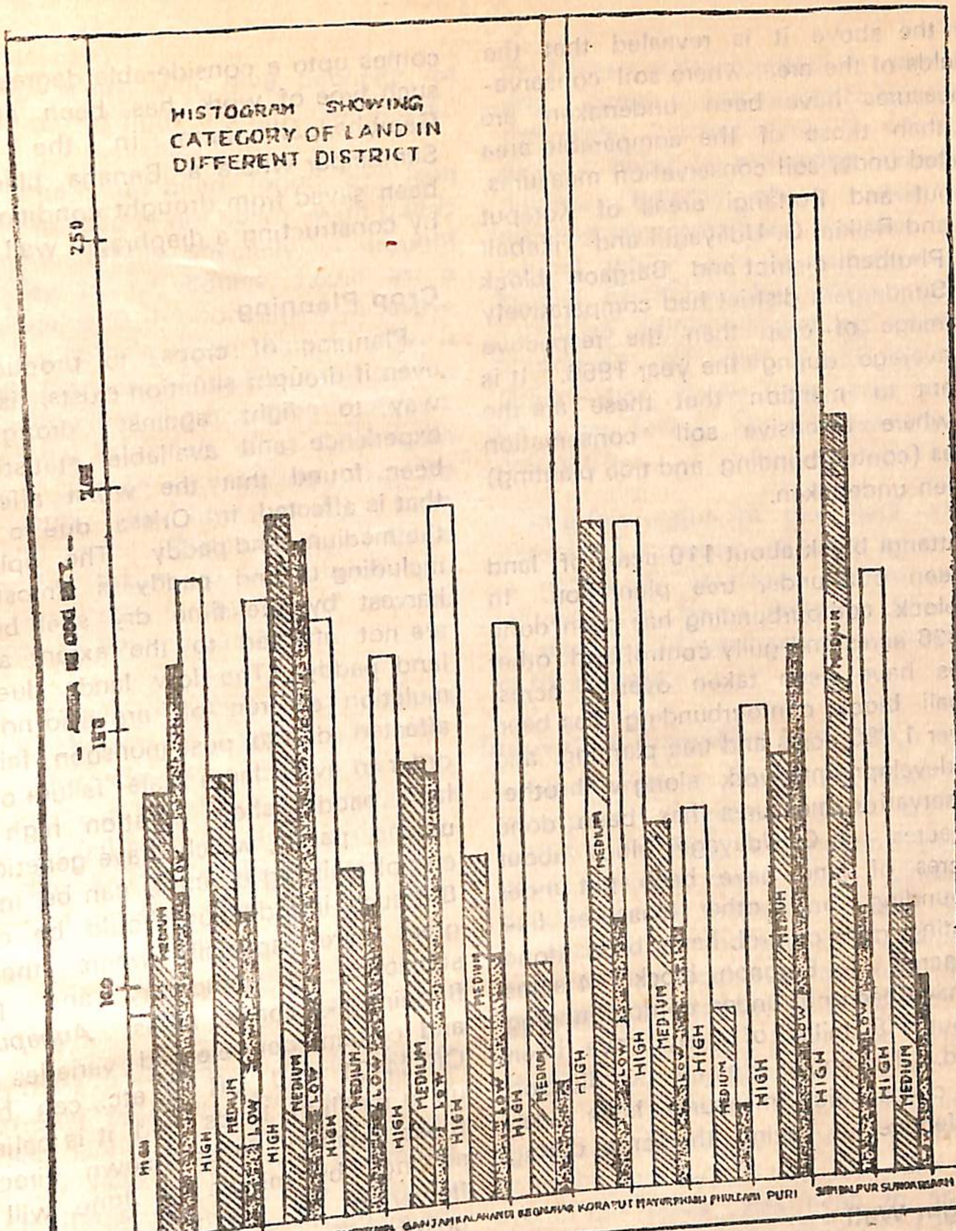


Fig. V

TABLE II

Amount of crop damage in C. D. Blocks treated under conservation measures

Name of the Block	District	Amount of loss in percentage during the year 1966	
		Block	District average
1. Lamptaput	.. Koraput	.. 13	16
2. Pottangi	.. Koraput	.. 2	16
3. Raikia	.. Phulbani	.. 5	31
4. G. Udayegiri	.. Phulbani	.. 6	31
5. Tikabali	.. Phulbani	.. 4	31
6. Borgaon	.. Sundargarh	.. 21	38

From the above it is revealed that the crop yields of the area, where soil conservation measures have been undertaken are higher than those of the comparable area not treated under soil conservation measures. Lamptaput and Pottangi areas of Koraput district and Raikia, G. Udayagiri and Tikabali area of Phulbani district and Bargaon block area of Sundargarh district had comparatively less damage of crop than the respective district average during the year 1966. It is significant to mention that these are the areas where extensive soil conservation measures (contourbunding and tree planting) have been undertaken.

In Pattangi block about 110 acres of land have been put under tree plantation. In Raikia block contourbunding has been done over 1,436 acres and gully control and other measures have been taken over 14 acres. In Tikabali block contourbunding has been done over 1,780 acres and tree planting and pasture development work along with other soil conservation measures has been done over 50 acres. In G. Udayagiri block about 1,054 acres of land have been put under contourbunding and other measures like tree planting, gully control, have been done over 80 acres. In Bargaon block 114 acres of land have been put under contourbunding and about 1/8 miles of gully have been controlled. The above is a clear indication that soil conservation measures have been much effective in saving the crop during drought.

Diaphragm Wall

A diaphragm wall is an ingenious device of constructing either a masonry or even a puddled clay wall underneath the ground to intercept the underground seepage line. By this process the underground water resources are enriched, which can subsequently be tapped by dug well or tubewells. These types of walls are specially suitable in self-defended micro catchments in hilly areas where generally the outgoing stream or gully bed can be excavated to construct a diaphragm wall. It is generally seen that streams and small rivers have underground flow in summer, though the surface is dry. By intercepting this subsurface flow, the underground water table comes upto a considerable degree. In Orissa such type of work has been attempted in Gambharipali farm in the district of Sambalpur where a Banana plantation has been saved from drought condition directly, by constructing a diaphragm wall.

Crop Planning

Planning of crops, to produce the best, even if drought situation exists, is the best way to fight against drought. From experience and available statistics, it has been found that the worst affected crop, that is affected in Orissa due to drought is the medium land paddy. The upland crops including upland paddy is almost ready for harvest by the time dry spell begins, and are not affected to the extent as medium land paddy. The low lands due to accumulation of run off are also not so much affected due to post-monsoon failures. In order to avoid large scale failure of medium land paddy, short duration high yielding upland paddy, which have genetical character of resisting drought, can be introduced. But such introduction should be done with great care, specially where the land is subjected to temporary and periodical flooding like coastal areas. *Annapurna, Bala* and certain per-released varieties such as OR 34-21 and OR 92, etc., can be taken up in medium lands and it is believed that those upland varieties if sown directly (line sowing) by middle of June will pass the flowering to dough stage before any possible failure of monsoons dry spell in middle September to October. Thus the critical stage when the yield of paddy goes down due to moisture stress will not be there. The Agricultural Extension Wing should advocate preparation of field right in April to May with pre-monsoon showers, in order to achieve this. Moreover, as has already been indicated, this kind of quick summer ploughing cannot be accomplished by the country plough and draft animals at the disposal of poor farmers. Large scale ploughing by power-tillers/tractors by letting out such machineries to the farmers by Agencies like Orissa Agro Industries Corporation or Directorate of Agriculture (Engineering Wing) may be helpful. At least demonstration of such practice in consolidated area will give publicity of such endeavour to fight drought conditions.

Many a time it has been found that land not suitable for paddy are sown with paddy and ultimately it fails specially in drought years. Paddy is of course taken as a prestige cereal, and is consumed in festive occasions by tribals, who hanker after it even if their land is not suitable for such a crop, specially when the monsoon is erratic. The Agricultural Extension Wing have again a vital role to play in introducting jowar like CSH-I, Swarna (for heavy soils), bajra (H. B.-I) and maize (Ganga 5), etc. Those crops can be taken up in uplands as a substitute cereal crop in the *Khairf* instead of taking risk of sowing paddy.

Besides cereal, legumes like cowpea (SFB 2), blackgram, greengram and red-gram or oil-seeds like castor (Aruna), groundnut, etc. can be taken up in the *Kharif* which will not fail even if there is drought. Moreover due to their short duration, a second crop of niger/mustard can be taken up in some of these lands.

Tree Planting

Planting trees to ameliorate micro climate is a long known practice. Trees planted as wind breaks along the periphery of farm lands and on field bunds help mitigating drought conditions, specially by diverting high velocity desiccating winds. The farmers in Andhra, Mysore and Hyderabad area generally plant, in large scale palm, which not only supplies timber for building houses but also palm leaf for thatching *Katcha* houses. Palm does not interfere in the annual agriculture but helps as a wind break. Besides palm, Glyricidia maculata (a perennial green manuring tree), Babul (Accacia species) and such other trees can be planted, on private farm lands, which will not only act as wind barriers to save crop from drought, but can be used as small timber, fuel and foliage for green manuring. In Kerala it is said, even "Glyricidia week" is being organised by Government when all the Government waste (idle) land as well as farm bunds are planted with Glyricidia to popularise the plant and to make the farmers self supported in green manuring. Green manuring itself helps increasing the water holding capacity of soils and directly helps in mitigating drought conditions. Besides above trees, drought resisting economic trees like *Ber* (Zyziphus jujube) which can be subsequently table topped or Simarouba glauca (I. C. A. R. 1970) an edible oil yielding tropical tree, introduced by the Soil Conservation Organisation in the State can be planted on large scales, as a measure against drought.

In a few region of the State which are chronically drought affected and irrigation is not ready at hand, pasture and dairy industry can be organised. Sheep both for mutton and wool can also be introduced in these areas.

Innovative Irrigation Methods

Much water is wasted, if a flow irrigation is applied. Moreover there is loss in fertility in leaching, and the crop yield goes down. Many crops also cannot stand flood irrigation. Besides above water is a scarce commonity and conservation irrigation has become an absolute necessity in modern civilisation. In order to accomplish this, many new and innovative methods of irrigation have been in use. Sprinkler irrigation, triakle irrigation that is irrigating by means of pipes, by sprinkling or at the spot by trickling by small perforation in the pipes, has heen in use. But these are some what sophisticated and may not be within the easy reach of poor farmers. In Orissa the bullock power remains idle and it is utilised only for ploughing seed bed preparation and harvesting operations. They are seldom used for irrigation purpose. Utilisation of bullock power by use of Persian wheel or mhote can be introduced in the State easily, in order to save the crops from drought conditions when the bullocks are almost idle.

A novel method of irrigation is what is termed as 'pitcher' irrigation. A pitcher or *Mati-mathia* (a burnt non-reglazed earthen ware pot) is used for the purpose. The *mathia* is burried up to its neck in the soil and filled with clean water. Vegetable seeds are planted around it. Enough water soaks through the porous pitcher into the root zone to maintain plant growth. Informations released by the Central Soil Salinity Research Institute, Karnal Punjab indicate that melons and pump kins can be grown by the above technique with water requirement of less than 2 cms/ha. in the entire 88 days of its growing period (See Fig. VI).

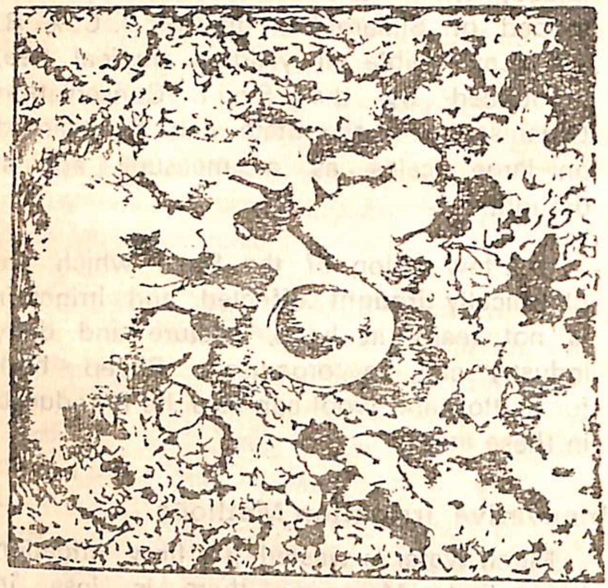


Fig. VI

Figure shows the 'Pitcher' irrigation system. A *mat mathia* is used for the purpose. The *mathia* is burried up to its neck in the soil and filled with clean water. Vegetable seeds are planted around it. Enough water soaks through the porous pot into the zone to maintain plant growth (Picture by R. C. Mondal, Central Soil Salinity Research Institute, Karnal, Punjab, India).

Conclusion

From the review of drought situation in the State as discussed in proceding paragraphs it can be very well guessed that drought is one of the chief national hazard which weakens the very backbone and economic progress of the state, The problem can, however, be solved, if sustained efforts are made to implement the remedial measures suggested in the text. However, there are many problems in the world, to which there is no true and readymade perfect solutions, but there is a near solution to most of them. Drought can be said as one such probiem. Many research findings, technical know-how, which have been established, and are beyond doubts, can be easily adapted in Orissa, to save the crop being damaged by drought. It can, therefore, be said in short, that with modern technology in hand and research, besides conventional irrigation system, we can surely stabilse the production, in our unirrigated lands under rainfed conditions and can overcome ill-effects of drought in near future,

REFERENCES

1.	Government of Orissa, Special Relief Department.	1955	Final report of drought in Orissa, 1954-55.
2.	UNESCO ..	1958	UNESCO's programme for arid lands—UNESCO informotion on Manual-3.
3.	Memoirs of India Meteorological Department, Vol, XXXI Part III.	1962	Monthly and Annual normals of rainfall and rainy days (1901-1950).
4.	Khosla A.N. ..	1963	Orissa's decade of destiny, 1963—1973.
5.	Drought & it's prevention ..	1966	Stare Soil Conservation Organisation
6.	Sen S. R. ..	1967	Agricultural situation in India Vol. XXI, No. 10.
7.	Koteswaram P. ..	1670	Climatological studies for dry land farming in India—All-India Seminar on dry land farming, New Delhi.

8.	Indian Council of Agril. Research ..	1970	A New Technology for dry land farming.
9.	Board of Revenue, Orissa ..	1971	White paper on drought
10.	National Academy of Sciences, Washington, D.C.	1974	More water for arid lands
11.	The Samaj	1976	A Local Oriya daily newspaper
12.	Lenka D.	1976	Water requirement of crops in Orissa
13.	Board of Revenue, Orissa ..	1976	Agricultural Census Hand Book, 1970-71.
14.	Pradhan S.N. ..	1976	Scope for Filter Point Tube-wells in Orissa.

HAPPY CHILD *NATION'S PRIDE*

1979—INTERNATIONAL YEAR OF THE CHILD

WITH A PRAYER & FLORAL OFFERINGS
AT THE LOTUS FEET OF **MA DURGA**

ORISSA CEMENT LIMITED

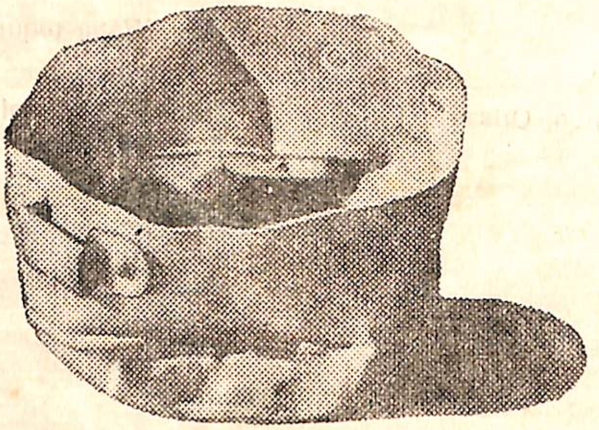
RAJGANGPUR—770017

TELEX—0635240

——leading manufacturers of CEMENT, SPUN, RCC PIPES, PRESTRESSED CONCRETE POLES and wide-spectrum of highly sophisticated REFRACTORIES—— OCL : a hall mark for quality, scheduled deliveries and customer satisfaction—— OCL : ever in dedicated service to the Nation

We threw away his bread earner.

The begging bowl.



Before we met him, he sang at funerals. He would kiss the mourners' feet for one dry chapati.

God helps those who help themselves

True. But when the beggar tries to take a step forward, the others take a step backward ... nobody wants contact with a rag.

The helpless

Homeless wanderers, pavement dwellers, scavengers, slummers, the 248 million in this country below the poverty line.

What are we doing

Every day some of these penniless receive financial aid from us. To start a trade, build a home, buy books... to draw them into the mainstream of society and help them live with dignity

Innovative banking

A special cell of the State Bank initiates these unique schemes for the downtrodden.

The Bank also goes to urban slums. Schools. Hospitals. Prisons. Calamity stricken areas. No area is untouchable...

Farms and farmers

It is the only bank with agricultural development branches. Special branches to finance day to day farming needs and novel agricultural schemes.

A scheme for every dream

For your son's education abroad. An easy retirement. Your own house. A kitchen garden. A shining new taxi-cab. A tidy business with tidy money.

The largest banking complex in the world

A complex of over 5000 offices, the State Bank finances national development projects on a grand scale. And plays a major role in representing India on the international banking scene.

We're growing. Not only in size, but also in involvement.

State Bank

Let's come closer

SB.470

OGP-MP-(XII)—(I. & P. R.) 48—5,000—27-9-1979

The meeting of the National Savings State Advisory Board was held on September 1, 1979 at Bhubaneswar, Dr. Ram Prasad Mishra, Minister, Finance (extreme right) delivered the inaugural address

Major General Mathew Thomas, Director General, N. C. C. visited Sainik School, Bhubaneswar on August 18, 1979

Picture shows : Major General Shri Thomas talking to a Cadet during his visit

Vol. XXXVI Nos. 2 & 3 ORISSA REVIEW Regd. No. O-4
License No C. R. N. P. 5—Licensed to Post without Pre-Payment

an open window

Rourkela has ushered in a whole new world of steel creativity in India.

First, as a major producer of flat steel products like wide and heavy plates, medium and light hot-rolled sheets and strips, cold-rolled sheets and strips, hot dipped and electrolytic tin plates, galvanised sheets and strips, high silicon steel sheets for electrical equipment, etc—it has catered to the different needs and varied requirements of such crucial industries as shipbuilding, automobile, locomotive, fabrication, wagon building, dynamos, transformers, tubes and pipes, domestic appliances, agricultural implements, defence equipment, etc., and more besides.

Then, it set the pace for innovative technology as related to steel and allied products.

From ERW pipe plant Rourkela graduated to India's first Large Diameter Spiral Weld Pipe Plant.

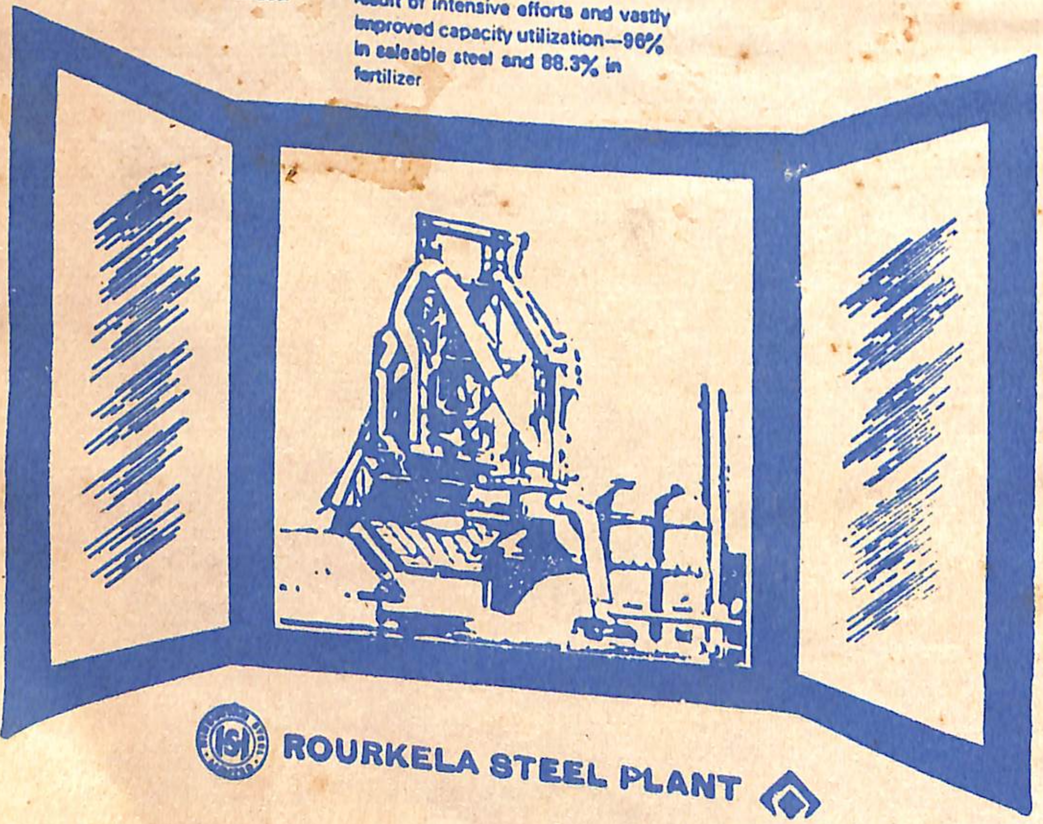
Besides, Rourkela also produces two types of chemical fertilizers-Calcium Ammonium Nitrate (SONA) and Ammonium Sulphate (RAJA).

Production and productivity at Rourkela achieved new peaks of performance. For example production of saleable steel rose from 8.12 to 11.74 lakh tonnes. Fertilizer from 2.45 to 3.18 lakh tonnes. All the result of intensive efforts and vastly improved capacity utilization—96% in saleable steel and 88.3% in fertilizer

A glimpse into Rourkela today will reveal much more than this. It will reveal the concerted effort of 37,000 people, sophisticated equipment, advanced know-how and research and development.

It will reveal an acute sense of responsibility towards industry and the nation as well.

In short Rourkela presents a view of tomorrow, today.



ROURKELA STEEL PLANT

Printed at Orissa Government Press, Cuttacck-10